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WORLD ECONOMY AFTER THE WAR.

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The present war is largely one of rival ideologies. Nazi Germany is fighting not merely for *lebensraum* but for the domination of other nations. The world order which the Nazis want to replace is defective in many ways, and this has given some help to Nazi designs. Therefore while we must exert every nerve to defeat the Nazis, we must also give our earnest attention to the building up of a better world order than the old effete one.

The Old Order

The old order evolved as a result of the Industrial Revolution in Europe. With the help of a new industrial technique invented in the latter part of the 18th century, the nations of Europe were able to evolve a new industrial civilization based on mass production and cheap transport, the steam engine being the basis of both. The extensive use of steam ships and railways gave a great impetus to world commerce and ushered in a new international economy. Under it industry flourished in Western Europe and North America, while other lands, mostly in Asia and South America, specialized in the production of raw materials and foodstuffs. England was the pioneer of industry and commerce, but later Germany, France and U.S.A. followed suit. Owing to a fairly general assent on the goal of laissez faire, trade over a large part of the world was unhampered by tariffs for long, and therefore there was great prosperity in countries specializing in industry and trade. But all this changed after 1914. By the rising surge of economic nationalism, international trade came to be hampered by tariffs and other barriers. Capitalism came under a serious challenge, led by Soviet Russia. International rivalries became bitter and resulted in the world war of 1914-18; and to-day we are in the midst of a more serious world struggle. The old order is nearly dead.

The world order that is now passing away had several serious defects. Firstly, while the industrialists grew in wealth and power, those who raised primary products did not have any reasonable share in it. Agriculture has always been the Cinderella of the economic system; it has done the dirty jobs, but the profits went largely to industry and trade. As Sir Thomas Middleton bluntly puts it: "Commerce, industry, finance and the services have by skill and organisation used to their own advantage the cheap raw products of the soil." This is borne out by the statistics of income in the different countries. In the U.S.A., a country of large farms, the annual income per head of persons engaged in agriculture is about Rs. 900 and that of persons engaged in industry about Rs. 2,300. Thus the agriculturist obtains only 40% of the industrialist's income. The difference is much wider in countries where agriculture is pursued by peasants, as in India and China. In England, where agriculture plays too small a part, the farmer makes little profit. Even so cautious a statistician as Lord Stamp has hazarded the view that "the world as a whole and over a given length of time has been fed below cost price for the last 100 years, if one takes into account the proper elements of cost." This was perhaps due to the lack of effective organisation among agriculturists and to the inelasticity of the supply of primary products, but there it is. In the result there has grown a yawning gulf between the few wealthy industrial nations and the many impecunious agricultural countries. The average American has an income of Rs. 2,000, but the average Indian has hardly Rs. 80 and the average Chinaman Rs. 60. Therefore while the standard of living went on rising rapidly in the West, it remained fairly steady at the old despicable levels elsewhere, especially in Asia. Thus, India and China which contain nearly half the world's population are still steeped in poverty and misery.

Secondly, even with the prosperous industrial nations, the profits from industry and trade were so unevenly distributed that the masses have remained comparatively poor. In spite of the great prosperity of modern England, half the population is living on inadequate diet, according to recent enquiries, and about a million persons are still unemployed with all the rearmament efforts lately. The international economy gave splendid opportunities to clever organisers and captains of industry; it made some of them multi-millionaires, but the lot of workers remained poor. "Morgan smiles and there is sunshine in millions of homes; Melchett frowns and there is starvation in countless families." This was fit ground

for the growth of Communism on the one hand and Fascism on the other.

The existence of poor but populous nations and the abundance of poverty in wealthy countries placed serious impediments on the onward march of prosperous nations and eventually inflicted a crushing blow on world economy. Large scale industry could only prosper when there is an expanding market, but the market could expand only if the masses obtain a steady supply of purchasing power. This was not possible without a fairly equitable distribution of wealth within nations and between nations. Hence the recurring slumps and the persistent unemployment which have pursued the West for long. The economic crisis of 1929-30 unbalanced world economy, and we cannot prevent its recurrence unless world economy is rebuilt on more equitable foundations. Above all, the purchasing power of the masses in India and China must increase rapidly if economic internationalism is to be set on its feet again. The industrialist believed that he could prosper at the expense of the agriculturist; but it has been demonstrated that this was the height of unwisdom. Industrial nations have to take the agricultural countries along with them if they wish to be prosperous. The great commandment "Thou shalt love thy neighbour as thyself" is not merely for our spiritual good; it is surely needed for our material advantage as well.

In spite of such serious defects, the old world economy would have functioned better and lasted longer had the nations of the West entered into some working understanding among themselves. Some of them held sway over vast territories and this roused the cupidity of others. Germany which always claimed a unique position in Europe has long hungered for a predominant place in world economy; its ambition was baffled in 1918, but it sought to wreak vengeance by forging all the engines of destruction which modern science is capable of and this has resulted in the present titanic struggle. If Germany succeeds, all that is most valuable in the present civilization will be in peril. Germany's designs could have been thwarted, nay aborted, had the nations that value freedom joined together betimes in fraternal effort. But this was not to be. The League of Nations had pious ideals before it, but it had not the slightest power of coercion over its members, and it has failed miserably to avert the crisis. Not only has Germany ruined the freedom of several nations; it now proposes to set up a Nazi system over all Europe and perhaps over the whole world. All those who value freedom have to fight against this, and must fight to a finish.

We now want a new world order. It must defend civilization against aggression from avaricious nations who want to dominate over others. It must ensure the world against recurring slumps and depressions. It must maximize the happiness of the world, even if this would reduce slightly the comforts of the few who are now wealthy. It must raise the standard of living of the masses in all countries and especially among the teeming millions of Asia. Above all, it must ensure a modicum of freedom to individuals and to national groups; for, personal liberty is the most valued of man's possessions. Sovietism and Nazism offer to do many good things, but that they will destroy freedom is certain and this makes both of them a menace to civilized existence.

The remarkable scientific and technological progress in the last one hundred years has made it possible to produce enough commodities so as to enable the whole of the world's population of 2000 millions to live in comfort, but politics has forged powerful barriers against such a consummation. In a world which has shrunk incredibly by the ease of communication and transport, mankind can live happily together, but certain selfish nations who want to dominate over others have set up autarchic systems by conjuring up bogeys like *'lebensraum'* and 'population pressure' and have embarked on a war of aggression. It may be that we will be able to frustrate their designs, but they or others may rise again for the same nefarious designs. Hence the urgent need for all free nations to enter into some friendly alliance for common objects.

Wanted—A Co-operative Order

About the form of this future order, various opinions have been put forward. Whatever be the exact constitution of the new union, certain fundamental principles seem clear.

The union must have a common defence organization, a unified currency system and well-adjusted trade relations. This involves a material sacrifice of national sovereignty. The tiny nation-states of Europe have prized their independence greatly, but recent events show that it is not so easy to keep it intact in these days. Within a short time, Poland, Norway, Denmark, Belgium, Holland and even powerful France have had to lose their national independence. Modern science has perfected the art of warfare, and with its aid a powerful nation which has no faith in international justice and which believes in Machiavellian ethics can overthrow the independence of many nations around it. Hence the futility of

independence in a world like the present. The need of the hour is for a union of free peoples for defending themselves against wanton aggression from outside. A common army, navy and air force will entail economy for all. For the cost of defence, the Union must have power to raise revenues directly. The League of Nations failed because it had only powers of moral coercion and nothing stronger.

The organization must be co-operative in outlook. The motto of co-operation is "All for each and each for all." The free nations must co-operate for their economic progress, because all can attain a higher standard of living, if they work amicably. On the other hand, if they work in competition, some may be better off, but the majority will be worse off; and even those who are better-off will not be able to maintain their prosperity for long, as they are sure to fall out among themselves. We have seen this demonstrated in the recent past. In order that the nations may co-operate, the causes of rivalry between them must be removed. The old idea of some countries being industrialists and others being agriculturists must be abandoned. Every country can have some industries after a certain level of development, and every country must also grow a considerable part of its foodstuffs. For the rest, all must depend on external trade. It is possible to reconcile the conflicting interests of various nations, if there is a spirit of give and take. This work must be done by an influential commission set up by the Union authorities. In this way, trade barriers between nations can be gradually removed, and the whole of the union territory can be brought under free trade, to the great advantage of all. With the fall of tariffs, prices also will fall, and this would bring about an immediate rise in the standard of living of the masses.

Within each State also, economic life must be organised more or less on the co-operative basis. Laissez faire or free competition has led to a great deal of economic waste and it has failed in solving the problem of poverty. Under a system of free competition, powerful monopolies are bound to arise and thus defeat the very object of competition. The gulf between rich and poor has thus become wider. Co-operation would provide a far more equitable basis, especially in consumption and in the production requirements of agriculturists. It must be admitted that co-operative production has not been a great success in large-scale industry, and there is still need for private enterprise and State effort, provided these will also be worked in the co-operative spirit. Public utili-

ties must be largely owned by the State or local authorities and over all the key industries, the supervision of the State must be minute and strict. The whole economic system must be worked with a view to toning down inequalities of distribution. As the "Times" of London put it lately, planned consumption must be the motto, and if this is to be a fact, the whole economic life must be shot through and through with the co-operative spirit. The "beggar my neighbour" policy must be crushed both in the international and in the intranational spheres.

In regard to monetary policy, it is not essential that there should be a common currency for all the members of the Union. Each may have its own national currency, provided it is pegged at given values in terms of the notes of an International Bank set up under the control of the Union. Such a Bank will expand or contract its note issue in order to help national monetary policies designed to off-set booms and depressions. It must also operate an international exchange equalisation fund in order to counteract speculative movements of short-term capital.

The Eastern Market Holds the Key

Such a currency system and the co-operative organisation of economic activity will greatly help in preventing booms and slumps, but world economy will not function harmoniously unless the standard of living rises among the poverty-stricken masses of Asiatic countries. This is only possible by giving them steadier employment. Therefore one of the prime objectives of the Union must be a development programme in India and China. This is not to be regarded as a charity concern, but as a safe business proposition. The disequilibrium of world economy to-day is largely due to the lack of purchasing power in the thickly populated countries of Asia, and Western industrialists must welcome this as it will provide a steadily growing demand for their goods. The economic development of the East may obviate its need for ordinary consumption goods (textiles and sugar), but it would create a steady demand for machinery and other capital goods, and subsequently when the standard of living rises, as is bound to, there will also be a growing demand for high-grade consumption goods, which only the West can supply. Many industrialists in the West have realized the possible beneficial repurcussions of Eastern industrialization on the West and have welcomed it. Henry Ford was once asked at a dinner what he thought was the way to a stable world recovery. He took his pencil and wrote on the table cloth the

numbers '160', '350' and '400', meaning thereby the potential purchasing power of Russia, India and China.

The importance of the Eastern market will be great, especially in the period immediately after the present war, when a severe depression is bound to arise. The development of the East has therefore to play a great part in the consideration of post-war problems.

For making a beginning in such a co-operative union, we must look to the British Commonwealth of Nations and the U.S.A. The British Empire can by itself make a beginning by transforming the Empire into a federal union. The British Empire is not a contiguous territory, but the British territories in the East are fairly near together. In the light of this, it was wise to have summoned a conference in Delhi of representatives from all the British territories in the East. The object of the Conference, let it be noted, was not merely to develop and co-ordinate their resources for the purposes of the war, but also "to establish some form of permanent liaison arrangement." One would wish this Conference had met a few months earlier. Let us hope that this will be a first step in the formation of a federal union on a wider basis. Such a metamorphosis calls for radical changes in some of the member countries, but it is well worth making in the interests of freedom.

The civilised world is involved in a severe struggle. Science has enabled mankind to provide itself abundantly with all the requisites of well-being and if the affairs of the world are wisely regulated, poverty can be blotted out of all countries. But man's perversity has defeated this purpose and the selfishness of nations is keeping the world poor and backward. It is high time we realized the folly of all this. The present struggle in Europe has already plunged in misery many countries which were formerly prosperous. May we hope that a change of heart will soon come about, that adversity will inculcate virtue and that all peace-loving countries will band themselves together into a union for the effective defence of their territories and for the steady progress of their peoples.

A NEW WORLD ORDER

By

Sir J. C. Coyaji

All great world-wars have been followed by attempts to create some sort of new world order. Thus, after the wars of the French Revolution, the world saw the advent of the Holy Alliance, as well as of a Quadruple Alliance by which the great powers were to meet periodically to discuss matters affecting the peace of the world. After the World War of 1914 a more ambitious attempt for the establishment of a world order was made, and the declared aim was to prevent the rise of new political grievances as well as to remedy economic distress. For obviously the formation of a world order has a political and economic aspect, and so close is the inter-action of these two sides that it is difficult to disentangle them and their effects. The efficient functioning of the mechanism of the world in both these aspects depends upon the recognition of the Co-operative principle both in the international and national spheres and on the political as well as the economic side. The need of the adoption of this principle as the pivot of all political and economic actions is so great that we find all great national leaders of the post war epoch from Wilson to Mussolini paying their homage to it. Looking back from our present position it is strange to find that only eight years ago Mussolini laid down the following dictum as the ideal of the world-policy of that day: "What the situation demands is the free movement of goods, of services, of people, of capital and of credit." Briand amongst the representatives of France and Stresemann speaking for Germany were not less emphatic and eloquent about the importance of having the principle of Co-operation permeating the sphere of world policy.

Defects of the former World Order.

Unfortunately, the attempt made to create a better world order after the Treaty of Versailles failed, and it is difficult to say whether the obstacles proved greater on the political or on the economic side. On the political side the adverse factors were—the isolationist policy of America, the deficiencies and blunders of President Wilson, as well as the persistence of France in a policy of

humbling and weakening Germany. Not only did Democracy prove itself unco-operative and revengeful in its hour of triumph but dogmatic as well; for it struck at the root of the monarchic principle in Austria and Germany. It forgot that for centuries the dynastic connection between the Kings of Europe had given at least some semblance of moral and co-operative character to European politics. It thereby opened the way for the rise to power of irresponsible dictators who had no traditions to guide and control them. It was, indeed, in the field of international policy that Democracy registered its greatest failures. The promising experiment of the League of Nations was ruined because the constituent democracies would not see their way to give up an iota of national sovereignty, of national armed strength or of economic nationalism. The feeble strength of the spirit of Co-operation in the League was manifest when it came to the use of sanctions against an aggressor.

Turning to the *economic* aspect of affairs we find that the post-War efforts to bring about a new world-order scored few successes, though they taught excellent lessons in "how not to do it" which will prove useful when a new experiment in the line comes to be launched. After such a great cataclysm as that of the period 1914-18 a great economic depression was only to be expected, but no systematic and well-thought out policy was adopted in order to minimise its effects. Capitalism which was already declining in vitality and power was progressively controlled and its liberty was curtailed; but no important effort was made to reinvigorate it by introducing economic planning and a conscious and reasoned direction of economic affairs. Much was said about Rationalisation and many books were written on the subject but little was done. It may be true, as Sir William Beveridge has put it, that planning under Democracy is as difficult as breathing under water. Yet difficulties are there to be surmounted. Some countries went as far as appointing Economic Advisory Councils, but no important successes were scored in the sphere of national economic planning.

Indeed, under the unhappy influence of Economic Nationalism the course adopted by nations was the very opposite of what a good idea of sound international planning could have dictated. That great country which was in a position to be the banker of the world, America, abruptly renounced that function of foreign investment which was so essential for a proper conduct of production and distribution throughout the world. France followed the example by withdrawing large amounts of her investment abroad.

As the great creditor countries insisted on raising their tariffs and in keeping out imports a serious maldistribution of gold resulted. The example thus set of selfish economic action proved contagious and economic nationalism soon entered on a course of unwise excesses. Tariff barriers were raised recklessly, national self-sufficiency became a wide-spread ideal and a race for depreciation of currency became the economic fashion. In course of time authoritarian economics supervened with its repertory of highly doubtful methods like rationing of imports, fixation of prices and profits and state guidance or dictation of the course and direction of industry. In such an atmosphere the last hope of general international co-operation was extinguished with the failure of the World Economic Conference.

However, the current tendency to place the largest measure of blame for the present sorry state of world-affairs on the shoulders of Democracy and Capitalism is to be deprecated. Any just survey of the world conditions of the day must emphasise the immense harm done by the spread of Communism during the post-War period and by the rise of a totalitarian state in Russia which formed the crown, the guide and the inspiration of that movement. It is impossible to have a totalitarian state in one country without causing the rise of similar states in neighbouring lands either by a process of reaction or by that of invitation or both. Had there been no Soviet State in Russia there would have been no Fascist state in Italy and Nazi State in Germany. Nothing but the rise of Fascism in Italy could have stayed the flood of Communism in that country. The Nazis in Germany exaggerated and utilized the danger from Communism in order to erect in their own country a state as totalitarian as the one existing in Russia. In fact they bettered their pattern. The capitalists as well as the middle classes in the Continental countries were so alarmed by the spread of Communism that they threw themselves on the mercy of the new dictators. Hence arose an unparalleled concentration of political and economic powers in the hands of these men. Such a concentration of powers had repercussions on the whole economic system of a continent with the result that the banking, the currency and the tariff policies of countries were used for strange purposes never dreamed of before. That Capitalism which had been controlled throughout the whole post-war epoch was now fettered and tied to the chariots of totalitarian masters. In France too the activities of the Front Populaire Government completely alienated the capitalist and bourgeois as well as peasant classes and caused a disruption of

the country both in the economic and political spheres which led to the ignominious downfall of the land. Even in Great Britain, the adoption of the policy of "appeasement" had for its background this fear of the growth of Communism. When Democracy and Capitalism are blamed for the present world disorder, it is but fair to recollect that both were paralysed by this Communistic "terror". Communism might be a noble economic ideal, but it must bear a very large share of the responsibility for the present disastrous state of affairs.

The future World Order

In envisaging the new World Order we must face the preliminary issue whether it will be possible and advisable to retain the Capitalist Economy as against its rival, State Socialism. No doubt the present most exhausting war must put an exhausting and unparalleled strain upon the vitality and resources of our Capitalist Economy. It might also be that countries like Germany, might when defeated in war throw in their lot with Communist Russia; that in other countries, too, during war-time the economic functions of the State will be enormously expanded. Nevertheless, in the long run and for most countries of the world the deciding consideration will be whether the Capitalist Economy utilises the factors of production inefficiently as compared with the State. We might adopt the judgment of such an impartial observer as Mr. Keynes on the matter: "I see no reason to suppose that the existing system seriously misemploys the factors of production which are in use." Consequently "apart from the necessity of central controls", a Capitalist Economy will be found preferable to State Socialism. Still as the process of socialisation will have gone further in some countries than in others we shall do well to assume the existence of a world in which some states are Capitalist whilst others might be arranged according to the degree or measure in which their economy is socialised. Similar distinctions and shades of difference will also be apparent between these states in the matter of economic planning.

It is obvious that any great war forms by itself a school of *Economic Planning*. Planning is after all a question of increase of central control; and we see how such central control of economic life been increased at a stroke even in Great Britain. Of course the lessons learned in war-time are of priceless value when peace supervenes. No one denies that in case of Democracies the task of Economic planning is more difficult than in a classless state like

Russia. For, in the latter case, all classes except one have been liquidated; while in the former, a chief task of planning is to lead to a fruitful co-operation between the various classes. As Prof. Ohlin has emphasised recently, a system of planning is needed which "combines flexibility with the possibility of centralized direction in certain special directions." We have to avoid that species of planning which brings under direct public management the major portions of the spheres of industry and trade and which will result in the diminution of the viability and flexibility of the economic system as well as of individual initiative and other dynamic powers of society. Such a system of planning will mitigate depressions and reduce unemployment as well as poverty. Nor should too much power be vested in bureaucracies under a sound system of national planning; rather the pivot of planning should be an Economic General Staff which is "not allowed to do anything but think about the future and plan for the future." Too often it is thought—mistakenly thought—that in economic planning we have only to follow the example of Russia, with its abrupt changes of principles and policy of planning, its immense mistakes costing millions in money and lives, its incessant accusations and punishments of subordinates for sabotage and its privilege of irresponsibility for the man at the head. It is not that sort of planning that we want in our new World Order.

There is another aspect of Economic Planning to which also considerable importance must be attached—the *planning of Distribution*. Democracy has been working—very slowly, it must be confessed—at securing the ideal of economic justice and of a desirable distribution of property and income. What Democracy can do in the matter of securing such justice is well illustrated by the achievement of Great Britain in the matter of the extension of social services, in that of the extension of Unemployment Insurance and Assistance and in that of the heavier taxation of Incomes and Inheritance. The tempo of progress might have been quicker; but the example of Great Britain shows that "it is possible to arrive at an economic system which gives security of work and social services for all, while giving free play to individual responsibility and to diversities in initiative and talent." Democracy might well be proud of the achievement of her eldest child in this sphere. There is no need to make an absolute equality of income our ideal, for there is no ground for the belief that such equality makes for maximum economic advantage. We have, in fixing the just and proper economic distribution to take account of such factors as the requi-

site supplies of saving for the purposes of war and peace and the necessity of a constantly expanding system of production.

We may now turn to some aspects of *International Co-operation and planning.* Let us take first for consideration the currency problem. Here a compromise between the points of view of Monetary Nationalism and of a fully unified International Currency seems to be advisable in the period directly following the present war. The advantages of an International standard are not to be denied in the important matters of international trade and international movements of capital and flows of money. But immediately after this great war the states will be neither able nor willing to part with their national monetary systems. This, however, does not mean the abandonment of co-operation in the sphere of currency; for it is possible and desirable on various lines, and, indeed, during the past decade several experiments have been made which show that this is the sphere in which international co-operation has unusually bright prospects. Thus the success of what has been termed the "Stabilization system" of currency, which was initiated in Great Britain but which secured acceptance throughout the region termed "Sterlingaria," is at once a sign of the potentialities of currency Co-operation and the high-water-mark of managed money. By the exchange equalization device gold is confined to its true scope of utility as international currency. The Three Power Currency Declaration of 1936 forms another happy precedent and example of international Co-operation in currency affairs. By it Britain, France and America agreed not to secure any competitive advantage by lowering the gold value of thier currencies. A still more promising experiment was the Monetary Alliance between Great Britain and France effected in December 1939 by which the franc-sterling rate was stabilised and a clearing agreement was effected for settlement of transactions between the franc and sterling groups of countries. What has been practicable in the past will also be carried through in future, and a flexible relationship will be maintained between currencies of different countries each being allowed in case of difficulties to alter the external value of its currency. That does not mean necessarily a system of elastic parties. Attention will also no doubt be paid to the promising international development of the Exchange Clearing System which has already yielded so many advantages and promises even more. It is fortunate that the path of international co-operation in currency affairs has been, comparatively speaking, so well trodden in the past and that, in spite of the present great cataclysm, foot-prints have been left which will guide us in the future.

Unfortunately, on the side of International Trade and Tariffs the past shows far fewer examples of that International Co-operation which is so necessary to economic progress. Instead of such co-operation we have seen during the last decade the advent of unusually high Protectionism which might be said to have led to the undoing of the economic integration of the industrial countries. Moreover even such high tariffs have been declining in importance compared to novel devices of trade policy—or rather of economic nationalism—like quotas and exchange restrictions, with the advent of Fascism the autarchic tendencies of nationalists have been greatly exaggerated. In this condition of accumulated hindrances and handicaps we cannot hope for any immediate abolition of tariffs and other nationalistic forms of restriction but must be content to follow the path of gradualism. But even here we are not without a few earlier precedents to cheer us on our narrow and difficult path. Thus we might remember the tariff truce concluded, if even for a short period, on the initiative of Mr. Roosevelt, and the work of the World Economic Conference of 1933. Here again the intiative must come from a great creditor country like the United States; for it is obvious that in the course of the last three decades economic power and leadership have been passing more and more to America. Moreover, we have to note the growing importance of "organised exchange between planned national economic systems". Thus, while there will be ample scope for national specialization, there will be great room for *planning international trade* so as to make the most of the resources of the world as a whole. In this aspect of foreign trade there will be a practical and welcome supersession of tariffs and other restrictions and hindrances to trade.

But there are other important lines of international co-operation which must claim a place even in a brief summary of that topic. There is, for instance, the thorny and difficult subject of the just and proper *international distribution of raw materials.* Any adequate solution of this problem would need a rationalization of the production as well as distribution of such raw materials under international agreement. It would be necessary to emphasise that facilities should be given to any country to provide itself with raw materials only so far as to meet its demands in peace time. No facilities should be given to any country to lay in supplies for future wars. Nor would that be the only condition precedent to be observed by any country seeking to take advantage of such a scheme of rationalization under impartial international control. It will also have to lower its tariff barriers and to reduce any restrictions that

it might have imposed upon international trade *pari passu* with such reductions in other countries. Even before international co-operation on such a scale can be inaugurated much useful work can be done by way of mere bilateral agreements. As Sir Arthur Salter and others have suggested, the British Government might agree to supply Germany with the raw materials wanted by the latter in exchange for goods produced in Germany on a ratio of exchanges determined by average prices over a sufficiently long period. But, while such bi-lateral agreements form a good introduction, our ultimate aim should be a state of things in which the production and distribution of raw materials in colonies should form a responsibility of the whole world acting on co-operative lines.

Turning our eyes to the *political aspect of the future world order*, we find there too a vast field for the application of the principle of co-operation. For, we shall have to consider how Democracy can rise superior to its own past and tackle the great tasks lying before it. Fortunately, co-operation is of the very essence of Democracy, and, indeed, Democracy is best defined as government by co-operation. Democracy has yet to learn how to select its leaders aright and to form a body of *elite*, to combine the merits of aristocracy and democracy. Such a body of *elite* is not to be constituted, as under other systems, by a group of self-styled supermen. Rather it is to be made up of the leaders of voluntary associations working together to solve the problems of democratic government. Democracy has also to secure the right inter-relation, co-operation and organization of political parties, to prevent the too great predominance of any particular interest or party and of party organization. Democracy has also to learn how to deal with the problem of minorities. Too often and in too many countries have majorities discarded the method of co-operation in our own age and have tampered and interfered with the spiritual, educational, and political rights of minorities. The world has a great deal to learn in these respects as well as in the way of forming a system of education suited to Democracy. Above all, Democracy has to learn how to master national sovereignty and has to acquire the art of giving up some of the extreme features and aspects of national sovereignty in the interests of international co-operation. For, in a word, Democracy has to be international and as wide as the world if it is to be permanent. That is the greatest problem of our day; and, if it is not solved, our Democracy will share the fate of that Greek democracy which bloomed two thousand years ago.

Grounds for hope and optimism.

Having enumerated so far the requisites of a new world order we might pause to see whether there are any signs of the times which are favourable to the formation of such an order in the near future. It is well that, by general admission, a European federation—perhaps even the federation of the World—stands in the forefront of our war aims. That is certainly a great prospect at once of an economic and political character. But an ounce of fact is better than a pound of theorising and we would fain know of any change of heart in nations and among their leading statesmen in this direction. Fortunately, the dire necessity to which nations have been reduced by this great war has proved an excellent instructor, and the tide seems to have at long last turned decisively in the direction of international co-operation at once political and economic. Thus it was a magnificent gesture on the part of Mr. Churchill when he proposed in June last, a permanent union between the British Empire and the French Republic and a pooling of their political and economic powers. That gesture has been followed by another and a more fortunate one—the sharing of naval and aerial bases, both in the Atlantic and the Pacific Oceans—between Great Britain and the United States. Add to these the gifts of destroyers by America and arrangements for common defence between that great country and Canada (or rather Great Britain). These policies constitute great lessons in the art of international co-operation between Democratic contries as well as in that of mastering international sovereignty. Compared to co-operation in these matters that on the economic side is far easier; and already both Mr. Roosevelt and Mr. Wendell Wilkie have strongly advocated the policy of "generous aid to the limit of prudence and effectiveness to Great Britain" and have deplored "the loneliness of the United States which was the result of the foreign policies of the last eight years." Here then, we are witnessing the formation of a great nucleus of the future great federation. As each conquered nation of Europe is liberated by the joint efforts thus contemplated, it will automatically join the new federation. Each such country will then be also in the right mood to join in the common economic and political policy of the federation and also to part with some of its national sovereignty. It is very probable that it is on these lines that we shall see the rise of a great world federation and the solution of the age-long problem of international co-operation in its political and economic aspects. We shall then learn to give a new meaning to the poet's dictum.

"Thus on the flaming forge of life
Our fortunes must be wrought."

WORLD ECONOMY OF THE FUTURE

By

Prof. V. G. Kale

Poona.

The present war has demonstrated the powerful influence which is exerted by the political, racial or social ideals of peoples on internal and external relations of nations in the economic sphere. During recent years the national or international equilibrium in trade and industry, in fact, in the daily lives of peoples, has been utterly destroyed. In certain countries, citizens have been deprived of their birth-right of individual freedom and they are dragooned by political cliques. Thus the very foundations of normal economic life have been dug up there and attempts are being made to create an altogether new national and world order. The substitution of autocracy and autarchy for popular liberty and freedom of competition, is intelligible as being inevitable and essential in times of war. What is however, peculiar to the present war is that years before its outbreak, what economists are wont to characterise as abnormal, had been systematically made the normal mode of life in internal and external relations by powerful nations on the European continent. Policies of States were dominated by ideals which were incapable of realisation by methods compatible with sound economical practice and reasoning. The period of war and a few years of the after-war period are usually regarded by economists as abnormal. But in the present instance, Russia, Germany, Italy and to a certain extent, Japan, had made the pre-war years as abnormal as the war period. All economic activities were regulated and controlled with a view to the attainment of a certain goal set before the people by their rulers. Economic considerations were subordinated to social, racial and political ideals, and individual freedom which within reasonable limits is essential for the smooth and beneficent working of economic life, was denied. Hobson's choice given to the people of Germany by their masters, between butter and guns is typical of this extraordinary state of affairs. The dictators have thus vastly improved on the ideals and methods of Mercantalists of the past.

Today's dictators of Europe have destroyed the freedom of the neighbouring nations by force and have sought to impose on them

their political yoke and economic slavery. They aspire to establish peace in Europe on the basis of this domination which they call "a new world order" and have threatened to confer the blessings of the latter on Africa and the near East. Japan has joined them and has declared its ambition to achieve in Asia what the European dictators have been doing in the West. What is the new "world order" which the Axis powers propose to establish for the good of mankind ? Under that order, it seems to be presumed, the "superior" world states will deal with other and inferior nations as vassals. The latter will be defended by the leading States and their trade and industries will be regulated and controlled in the supposed interest of all. Peace will then reign in the whole world and under the protection and guardianship of the dominating powers the well-being of humanity will be safely and soundly promoted. The natural resources and the markets of the south will be controlled and distributed according to what the protecting angels regard as equitable and economic standards. If the actions and the declarations of dictators are any guide, such appears in substance, to be the conception of the world economy of the future formed by the ruling parties in Germany, Italy and perhaps also in Japan.

The very idea of such a world order resting upon brutal conquest and barbarous domination is repugnant to the mind and the spirit of every civilised person. The first task of all people who value individual liberty and national freedom lies, therefore, in preventing and destroying world domination that is now being attempted. A world economy that is expected to be beneficial to humanity, must be based on international co-operation and harmony. Individuals and States must be free to live their own lives without interference from outside and this freedom will be restricted only by common consent and general agreement. In a national economy effort is made to harmonise individual and common good. National good and the good of mankind have to be similarly reconciled by agreement. It is the failure to bring about such a harmony that has been responsible for internal conflicts within States and wars between nations. Mussolini's conception of aggressive war being an essential instrument of national progress and the Nazi theory of racial superiority are antagonistic to ordered, peaceful and happy human existence. Whatever excuses the dictators may put forward for their aggression and brutality, a world order can, not conceivably be based upon their principles.

World economy cannot be divorced from world politics. In fact, it is intimately bound up with international political relations.

With the march of modern material civilisation, nations have increasingly recognised the significance and the value of mutual understandings and common institutions as conducive to the general well-being of mankind. The post, the cable, sea transport, trade agreements, exchange of commodities, international banking are devices which have been employed to knit together the different constituents of world economy. In national economies the national States regulate these matters so far as regulation is necessary. In world economy, mutual agreement is the connecting link and common benefit is the motive. Thinkers of the liberal school believed that in the international as well as the national economic sphere, activities inspired by the individual economic motive and unhampered by State regulation, made for the well-being of all. This was a reaction against the Mercantalist system in which States dictated to their people the channels through which trade must pass and the manner in which agriculture and industries should be developed. It was believed that the abandonment of this policy and the adoption of *laissez faire,* would, by the removal of restrictions on individual initiative and freedom, lead to better exploitation of the national resources of the world, to an increase in the efficiency and productive capacity of labour and capital and to greater and more rapid progress of mankind. These results were, however, only partially achieved. With the extension of its territories and the expansion of its markets and sources of raw materials England did increase its productive capacity and wealth; and this growth of prosperity could be attributed to individual initiative, daring and organising power which made the most of improved machinery and every other means of making profit. British economy, however, suffered from lack of equilibrium within and other constituents of world economy soon began to feel that they had been left lagging behind in the race for economic prosperity. Germany, the U.S.A. and other countries thought that they had no use for a *laissez faire* policy which was wholly unsuited to their peculiar conditions and that Government patronage and regulation were essential for the development of their industries and trade. This new attitude was supported by a school of economists on a modified theory of international trade and of the relation of the State to the nation's economic life.

World economy consisted, before the last Great War, of national economics pursuing varied policies regarding economic development, differing in kind and degree as regards State intervention in matters affecting industry and trade. A working understanding existed between nations as to currency, exchange and commercial

policy in spite of protective tariffs and fiscal disputes. A kind of a balance of power and economic equilibrium supported world economy. The stability of the balance was, however, frequently threatened by the political ambition of certain nations and the discontent of others with their position in world economy. The Great War caused enormous destruction of life, property and wealth. National and international debts were piled high. While the productive capacity of certain industries increased, the power of consumption of peoples declined, channels of trade were changed and sources of raw materials and markets for finished goods were disturbed, currencies and exchanges were in confusion and a severe slump succeeded a boom. The wounds left on the body of world economy by the Great War took long to heal and in the course of the cure, the economy underwent a radical change.

In Europe, there was, after the War, great activity in the rearrangement of national boundaries. New States were created and old ones were reconstructed. Old markets and sources of raw materials were split up and joined together without regard to economic consequences. Repayment of international debts created difficult problems and trade and international exchanges were thrown out of order. It took years for the world to settle down in this altered political and economic conditions and for a new world equilibrium to be established. Nations tried somehow or other to adjust themselves to the altered conditions. The League of Nations and the International Labour Office which had been set up to watch and guide the international system emerging from the peace, put forth continuous efforts to facilitate the change over and the establishment of stable political and economic relations. The preservation of the independence of small nations and of democracy was the basis of the new world order. But Germany was chafing under the new arrangements and nursing revenge and Russia soon broke away from them. The Nazi policy in Germany decided to upset the world order which emerged from the peace treaty and began its preparations for attaining this object. It meant the reorganisation of Germany's national economy and a radical change in its external economic relations. Italy followed its neighbour's example. The ideal of economic self-sufficiency, adopted by these two nations and the systematic efforts made by them for its success could not but adversely affect the structure of world economy which had already to face the efforts of the political and economic revolution in Russia. The League of Nations proved unequal to the task of defending the world order which it had been created to safeguard. It

could not likewise bring about adjustments in that order which experience and general feeling had shown to be necessary. World economy became unbalanced owing to the defection of Germany, Italy and Japan whose policies of aggression became a serious disturbing factor.

This was the state of affairs when the present war began. Before the task of reconstruction can be thought of, the disturbers of world peace have, of course, to be first defeated and the kind of order they want to impose on the world has to be prevented. The terrible ravages of the war will have to be repaired and the work of reorganising world order and world economy will have to be taken in hand. This will be one of the most difficult of tasks for all peoples of good will to perform. The war effort itself will have given a new turn to trade and industries. Exigencies of war have already made it imperatively necessary to establish and to expand certain industries, the future of which will have to be safeguarded. India's resources in raw materials and man power are being developed so that they may effectively contribute to common victory. Germany has already been manipulating the resources of conquered and occupied countries to its own advantage. It is certain that the people of these territories are longing for the restoration of economic as well as political freedom and this will have to be guaranteed to them. The British Commonwealth of nations and the U.S.A. will have to take the lead in constituting a sort of a world-federation of which free nations will be members and whose mutual economic relations will be inspired by common interest and regulated by common consent. It will be a tremendously difficult job to distribute productive power, industries and trade among the members of a world federation so as to give equal opportunities to all and to promote the well-being of every nation and race. If all the enormous losses, hardships and misery which the present war will have entailed, will not reconcile peoples of the earth to the idea of a world federation, all hope for the future of humanity must be abandoned. A world state may be a *Utopia* but a world economy reconstructed on the principles of equality and justice for all, will have to be accepted as a sheer necessity. Nations of the East as well as of the West will have a vital part to play in this world organisation and there is no reason why it should not succeed. There is at least no reason why an honest and earnest effort should not be made in that direction. The weak points in the organisation of the League of Nations are now patent and we can learn a great deal from the experience of its working.

It will be futile to try to work out the future world economy in any detail. It is sufficient to realise what its general lines and underlying principles will be. The experience of the period between the peace treaty at the close of the Great War and the outbreak of the present war will be a useful guide. It will have to be reinforced with our knowledge of the economic developments that will have taken place in the course of the present struggle. Account will also have to be taken of the recent happenings in Africa and Asia, the needs and aspirations of the nations and peoples of these continents, and in the light of these, of the basic requirements of the future world economy.

INTERNATIONAL MONETARY RELATIONS

By

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Economic or technological changes are forcing mankind in the direction of world-wide integration and interdependence but political tendencies strongly resist that trend. Technology makes for easier, larger and more rapid movement of goods, capital, labour and ideas across frontiers but politics constantly erects walls that restrict all these movements. Peoples of the world work at cross purposes and political nationalism refuses to adjust itself to the internationalism created by scientific advance and technical devices. A conflict rages between world economics and political units and there will be no stability till these forces have been accommodated to each other. After nearly a century of astounding discoveries and inventions which have multiplied the power of producing wealth almost at the will of man we still find ourselves in the same plight as the one described by Friedrich List, the difference being that what was then true of Germany is now true of the whole world. He says, "Thirty-eight customs boundaries in Germany cripple commerce as if each limb of a man's body were bound so that the blood could not flow over into another. To trade from Hamburg to Austria or from Berlin to Switzerland you must go through ten states and pay ten transit duties." In those days nationalism was a movement towards unity but to-day it has become in large part a movement for disunity and a clog in the progress of technology and economics which have by far transcended national limits. Political nationalism has Balkanized the whole world while economic technology has made of it a unified whole.

The tendency of technology is to expand the volume of international trade transactions while the tendency of politics is to contract that volume and live within the narrow confines of a nation. Barriers to economic intercourse constitute a major cause of wars, for they diminish economic opportunity of enterprising nations and give rise to fighting slogans such as "population pressure, access to raw materials, spheres of influence, and economic

imperialism." The first condition of political peace as well as economic welfare is to lesson the economic significance of political boundaries.

The structure of economy in future will be characterized by a mixed system, namely the principle of free enterprise, and the principle of conscious control will function side by side. The mixture of these two principles will be different in different countries and it will range all the way from liberal to planned economies. It is a problem of the first magnitude to work out methods for mutually beneficent relations between economic systems of divergent types and to switch on national politics from power economy to welfare economy.

We are at present concerned only with one aspect of international co-operation, namely how to secure monetary stability, how to counteract the business cycle, how to create the conditions under which a steady economic expansion can take place, and how to reconcile internal stability of the domestic prices with the external stability of one country's currency in terms of foreign currencies.

We have to determine the respective roles of *laissez-faire* and planning in the sphere of international monetary relations. As in other spheres we have to decide what should be left to the working of the automatic market forces and what should be subjected to conscious public control.

The primary task of the monetary system is to aid in the exchange of goods. The smooth functioning of the currency and credit system is an indispensable condition of international trading. On the behaviour of the money mechanism depends so much of those inflations and deflations, booms and depressions which make peaceful adjustments well nigh impossible.

We must first of all clear the deck for action and jettison a great many die-hard notions. The first is the tradition of an automatic self-regulating gold standard which under modern conditions has lost nearly all its merits. The idea of money linked to gold may be given up and we may move on to the position where the total amount of money supply and the ratio of one national currency unit to another are matters of conscious management. In the second place we need a psychic revolution whereby panics which are easy to start and hard to stop could be eliminated. The international movement of funds should be in response to trade require-

ments and not as a result of fear. In place of "hot money" and "floating balances" there should be healthy foreign lending. In the third place various instruments of monetary management have been devised or discovered such as manipulation of the bank rate, open market operations, devaluation, sterilization of unwanted gold funds, changes in the reserve ratios of banks, exchange equalization funds and public works policy but these are operated by national governments each in its own interest and frequently at cross purposes with others. These instruments should be wielded by an international body or by an association of national banking systems. Some experiments in monetary internationlism have been made already e.g. the sterling bloc, the tripartite agreement between Great Britain, France and U.S.A. and the Bank for International Settlement. Concerted action along these lines should be further developed.

It is not possible for any country to insulate itself against world currents. No country acting alone can secure full employment of its productive resources. The world economic depression of the nineteen thirties was met by each country following its own policy of beggar-my-neighbour with the result that the crisis deepened and assumed disastrous proportions. Economic wisdom lay in the direction of co-operative efforts to arrest the downward sweep of deflation. Monetary nationalism has been the bane of a stricken and divided world and in place of international agreement for the good of all we have had competitive depreciation, mounting trade barriers, exchange controls and autarchy. We do not wish to convey that monetary policy alone can keep our economic system in smooth running order but that it will go a long way in achieving world stability and ordered development.

The world having become a single economic unit we have to move more and more towards international control and inter-regional co-operation. In the monetary sphere we must devise an International Authority which will undertake the responsibility of regulating monetary relations between the Member States. The obvious suggestion is that they should adopt a common international currency.

An international currency may take various forms.

(1) A number of countries may agree to adopt a gold standard and the same monetary unit of account. They will co-operate in minting coins of the same gold value and with the same name as distinguished from the orthodox gold standard which operates

through the free coinage of gold into national coins such as the gold sovereign or the gold dollar. In no fundamental respect will the international currency differ from the old system based on the free minting of national coins except the convenience of having the same monetary unit of account for all countries under consideration.

A further development of the same system in consonance with modern banking practice would be that each Central Bank would issue notes of the same designation and the same gold value. The countries would be using the same monetary unit and the Central Bank of each country would be under the legal obligation to buy and sell gold at a fixed price in terms of its note issue.

(2) A number of countries might agree to set up an international Bank charged with the sole right of note issue. These notes will form the only legal tender currency and they may or may not be backed by a reserve of gold. In each country there will be a Central Bank fulfilling all the functions of a central institution except the right of issuing notes. For example the Central Bank will have the power of raising or lowering the money rate at which it is willing to grant credits and also the power of expanding or contracting the quantity of deposit money through open-market operations. The credit supply put out by the Central Bank will be regulated by the necessity to keep a sufficient reserve of the notes—the international Bank notes to meet the demands made by commercial banks for these notes.

The principal merit of this system is that the total monetary supplies of the countries in question will depend not upon the accidental circumstances of gold mining and the demand for gold for monetary as well as non-monetary purposes but upon the trade demand for the circulating media. The international currency is well adapted as an instrument for adjusting the balance of payments among the Member States. If, for example, one particular country shows an excess of imports over exports, the excess will be paid off by a shipment of notes. In consequence there will be a reduction in the supply of money which will cause a fall in incomes, prices and costs and conversely a rise in the countries receiving the exported currency notes. These movements will check the initial excess of imports on the one side and the excess of exports on the other till equilibrium is restored and the surplus of payments over receipts in the trade balance disappears. For a time the Central Bank may offset the loss of its note reserves by ex-

panding the internal supply of deposit money but sooner or later the continued export of monetary reserves will threaten the stability of the Central Bank and it will be obliged to restrict credit and deflate incomes and prices and thus ensure the convertibility of its deposits into the international currency.

Yet another advantage over the system of independent national currencies is that the rate of exchange is a fixed known quantity. There is no fear of frequent fluctuations and international trade will be relieved of the haunting fear of unstable exchanges and the flight of capital from a currency which is expected to depreciate to one which is reckoned to be sound thus causing disturbance to both.

Will an international system based upon, let us assume, free trade and a common currency remove the menace of trade depression? The answer is that these two criteria alone will not immunize our system against periodic booms and depressions, for during the nineteenth century trade fluctuations occurred despite an international gold standard and fairly liberal conditions in world trade. In order to exercise adequate control over trade conditions and prevent industrial fluctuations the International Currency Authority must have the ultimate power of regulating the total supply of money within the Member States. Whenever a trade depression tends to develop itself it could expand the issue of notes and increase the monetary reserves of the various national banking systems. It could thus correct the manifestations of the oncoming depression e.g. reduction in prices, costs, incomes and money expenditures. Conversely at the onset of a boom it could restrict the total supply of money and thus hold in check an inflationary movement showing itself in a rise of prices and incomes.

It is however doubtful how far the control over supplies of currency can be made effective. For one thing the Central Banks while receiving the additional supplies might take steps to sterilize the new currency and prevent it from fulfilling its function of monetary expansion. Secondly, even if the International Bank could exercise effective control over the total money supplies in the Member States there is the additional difficulty to be encountered, namely that business enterprise might be unwilling to use the additional funds. These funds are intended to arrest the downward movement of profits and prices and if private enterprise will not react to cheap money and plentiful money the depression will have its own way. In such a circumstance each state under the direction of the International Authority should make use of the idle funds for public works until private enterprise once again gets a move on.

In a dynamic world there is constant need of machinery for re-adjusting a disequilibrium in the balance of international payments. Apart from a general trade depression, the disequilibrium may be caused by several forces such for example as that country A producing rice for export and country B producing wheat for export may discover a marked tendency for the substitution of wheat for rice. Country A will be faced with an excess of payments over receipts, causing it to lose monetary reserves and Country B will be in a contrary situation. To correct the excess in each case the proper remedy would be, leaving aside the device of import restrictions, a monetary deflation of incomes, prices and costs in A or a monetary inflation in B. Deflation of prices will lead to a reduction of profit margins and so to unemployment but the extent of the damage and the quickness of the recovery will depend upon the flexibility of costs such as wage rates moving downwards with the falling prices. The efficient working of the International Currency system depends upon the resilience of the costs in the Member States. But national planning of prices and costs produce considerable rigidities which prevent an easy adjustment to new conditions. For example the railway fares, the rates for gas, electricity and water, the school fees, rents, insurance premiums, and the prices fixed by industrial cartels and agricultural control schemes are all in the nature of long-term contracts and a general deflation of money incomes and money expenditures would lead to a considerable decline of production and employment while prices and costs would painfully and sluggishly adjust themselves to the deflated level. If the fundamental condition of flexibility is not satisfied—in the planned systems rigidity is a marked feature—then the necessary readjustment between the countries must be made by variations in the rate of exchange.

Free trade or freer trade will assist the process of reestablishing equilibrium. It is easy to stimulate exports as a corrective of a country's trade position in the absence of tariffs and various restrictive measures. Free trade will reduce the extent of the period of deflation as the exports will be stimulated under the twofold impulse of no restrictions and lowered prices. Hence a general lowering of trade restrictions will greatly aid the successful working of the international currency.

WORLD ECONOMY AFTER THE WAR

By

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I

For well nigh three quarters of a century before the last Great War the Western World had developed something like an international economic order in which the main ingredients were relative freedom of trade, of capital and of labour. That economy was based internally upon what may broadly be termed as capitalism, in which the mainspring of all industrial and agricultural life was the motive of profit, subject to a limited sphere of economic activity on the part of the State. In its external aspect it may be described as economic liberalism in which people believed in the efficacy of international specialisation of functions and exchange and in raising their material welfare by freedom of trade and commerce. Such an economy was greatly strengthened by a world monetary system which, originally based upon bimetallism and later upon gold, functioned smoothly. The international gold standard brought about a fundamental unity in the price and income structure in the various countries which had adopted it, for with fixed exchanges between the currencies of various countries, it not only ensured a smooth flow of goods and facilitated free and safe movements of capital but also unified the industrial structure of countries all of which were more or less similarly affected by the same set of monetary and economic factors.

Such a system did work fairly satisfactorily for a considerable time. What is even more important, nations came to believe that on the whole it was the best system conceivable and that it stood for great and rapid economic progress. It was the logical culmination of the operation of those germinal ideas of freedom of competition, self-interest and *laissez faire*, which exerted such a strong and powerful influence in the 19th century.

Not that these forces of competition and *laissez faire* operated at any time undisturbed. Freedom of competition was found, in practice, to be greatly limited by the serious inroad of monopoly into economic life. Combinations and other associations of industrial units greatly modified the pristine purity of free competition.

Nor was the State that passive instrument which the *laissez faire* doctrinaires would make of it. Governments began to control certain spheres of economic activity and to interfere in other directions. Further certain rigidities partly brought about by the State and partly by the action of organisations of workers had crept into the system which increasingly damaged the resilience of the economic system and its adaptability. So that the world of free competition and economic liberalism was not the world contemplated by Adam Smith and Mill, nor was the role of government that assigned to it by Bentham.

But despite all the above modifications, the picture of the Western World as a unified economic unit broadly remained true. The achievements of such an economy were, if not spectacular, undoubtedly great. It saw a vast and rapid increase in national wealth. It brought about a great increase in population. New regions were conquered and resources exploited. The growing population of the world was fed on an increasing scale of living, never before equalled in the history of mankind.

Unfortunately, however, this bright picture of world economy had its own dark patch. Side by side with the division of the world into national states, capitalism brought about a new division, the world of the rich and the world of the poor—the haves and the have-nots. The grave inequality in the incomes of the people within each country, whether it may be justified or not and whether it should be regarded as an inevitable and necessary accompaniment of capitalism or only an incident which may be done with, remained a festering sore. Secondly, its claim that however defective it may have been in the sphere of distribution, it always ensured a continuous increase in the stream of production could not be sustained in the face of the ever-recurrent crises and depressions which it could do nothing to avert. Millions of people are thrown into the dust-heap for no fault of theirs, and an economy which can function only on the basis of these periodical hold-ups and breakdowns cannot be considered to be even reasonably efficient. But even more important than the above is the fact that the trade cycle has broken up the economic unity of the world, which constituted its main claim to merit. The economic world has now been cut up into bits. There is no international monetary system based upon a common monetary standard. Prices and incomes do not move and are not allowed to move in unison. Trade and commerce are no longer free. Each country is seeking to raise a mountain-high level of tariffs and to impose other forms

of barrier to the free movements of goods. Capital no longer seeks the regions of profitable investment; and refugee funds move from one centre to another in desperate search of the will-o-'the wisp of security. The free flow of labour from one country to another, i.e., migration, has been also arrested, thanks to the policies pursued by the U.S.A., Australia and other countries. To-day there is no world economic order, even if one confines his attention to the Western world.

Again, as Dr. Thomas has rightly pointed out, in all this material and industrial advance, the East has had to play the role of a Cinderella. Colonies have been exploited, not in the interests of the peoples living therein, but to the benefit of the Western nations. Such an unjust order of things contains within itself the roots of destruction.

Finally, the world economic order despite all its conscious and unconscious efforts was unable to check the aggressiveness and cupidity of capitalists in their exploitation of resources and search for markets. Wars have been brought about partly by economic factors, and some wars at least have been the result of predatory capitalism. In their anxiety to make profits, however dubious the methods may be, capitalists have not infrequently thrown in the full weight of their economic power for development of the armament industry—thus directly promoting the chances of war.

II

The world can no longer afford to have two such wars on a major scale within the short span of 25 years. Between these wars and the trade cycles, the old kind of capitalism is doomed. There is no chance of capitalism emerging unscathed after this war. It has played itself out. The instruments of control which the war has evolved are not likely to be thrown into the scrap-heap, but will remain as more or less permanent methods of control. What should be the nature of the economic order within each country after the war, and what should be or would be the nature of an international order are questions the answers to which are bound to be extremely uncertain. Much will depend upon the ideas that now dominate the peoples of the world and at the time when peace terms are settled.

Within each country the nature of the internal economic system that will emerge after this Armageddon will depend upon the respective ideologies prevalent in different countries. It is,

however, safe to state that no single uniform pattern of economic organisation will be adopted by all countries and that differences in economic structure and organisation are inevitable. There are, of course, various possibilities. In the first place, there is the possibility of an extension in the sphere of state ownership and management of enterprise, not as a mere compromise between capitalism and socialism, but as a deliberate and conscious effort to get the best out of both private enterprise and initiative on the one hand and of public management on the other. In the happy language of Sir A. Salter, the new organisation should be based on "selective compromise," and seek to retain the best features of both.

The second type of development is the extension of the sphere of co-operative organisation. The British Consumers' Movement has developed vast trading activities and eliminated the profiteer. But the forces of capitalism have combined with certain classes of producers to arrest its onward march. Consumers' organisations have now to fight not merely the monopolist manufacturers, the cartels and combines, but also agricultural marketing boards. Surely in view of the superior moral foundation of the co-operatives, a new attitude to their growth and development is called for. The co-operative movement is directed towards organising industry on the basis of mutuality—All for Each and Each for All —and there can be no conflict of interests between the producer and the consumer, because the gains of production accrue to the consumer. Great Britain, Sweden, Finland are countries where productive organisation directed by and in the interest of the consumers has reached a high stage of development. In other countries like Holland, Denmark, Belgium, Switzerland, etc., agricultural co-operation has done no less service to the ryots; and the bulk of production and marketing is in the hands of co-operatives which have ensured a fair deal to all. In the future organisation of industry and agriculture therefore co-operation may be expected to play a large part. It should supplant private capitalism, and should function alongside of national, local and other semi-public organisations controlling spheres of economic activity which cannot readily come within the range of co-operative activity. In any case the whole economic life of a country must be permeated by the co-operative spirit. No industry should be allowed to carry on unless its profits go to the community as a whole and are prevented from enriching the pockets of particular sections of the community.

But these by no means exhaust the possible lines of development. There is the totalitarian form of economic organisation which has taken in recent years two forms, the Fascist and the Nazi forms and the Soviet-socialism of Russia. There are those who find nothing to choose between these two. But it seems to the present writer a clear mistake not to be able to distinguish between the two. With all its shortcomings, the communism of Russia has been inspired by the desire to eliminate poverty and to ensure economic equality. Nazism and Fascism despite all their achievements stand for the overthrow of democracy and for the over-glorification of the State as against the people. The people's welfare is but an incident in the march of the car of Juggernaut.

But what is going to happen in the future after this war ends? Can we be sure that the organization of the Italian and German variety will disappear and that of the Russian type be considerably modified so as to ensure greater freedom to the common man? We cannot tell. But it is open to us to suggest that socialism of a more democratic type than has been evolved so far is not only practicable but is likely to be established in some countries. The reasons for this view are several. Only one or two need be put down here. We have not yet discovered a way to do away with vast accumulation of wealth in the hands of individuals by the pedestrian methods of income and death duties. Indeed, the distribution of wealth and income has been more, and not less uneven after these taxes have been imposed than before. Secondly, the elimination of the problem of unemployment and the combating of the slump can only be achieved by a more direct action on the part of the States. Hence it may be expected that some countries at least will embark upon socialism in which all the instruments of production will be entirely owned and controlled by the State and that no one will be allowed to work for an employer other than the State.

III

We shall thus have different types of economic organisation functioning at different levels. But if we are not to revert to barbarism, but restore civilization back to humanity, we cannot afford to give free rein to the forces of selfish nationalism and aggrandisement which have marked the activities of a number of States in recent times. National differences of organisation may be permitted up to a point; but these differences should stop short of exploiting or injuring the peoples of other countries. From this point of view it is doubtful whether there can be any hope for the

world if the ideas that now permeate the States in Germany and in Italy are allowed to exert any influence after the war. There are some who hold that a world order can be built out of very divergent and conflicting economic ideologies. Mr. Meade for instance in his very interesting book entitled *The Economic Basis of a Durable Peace* pleads for a place in his proposed new international organisation for all kinds of rival economic systems. But surely there can be little common ground between Nazi economic system and an international economic system, for each is based on entirely different and opposite economic principles. We should therefore draw the line at the Nazi or Fascist economic systems, unless they are prepared to shed their militant and aggressive nationalist spirit and willing to co-operate in the evolution of a new economic order.

The New Economic Order must be based upon a frank acceptance of a new scale of values in which no group can be allowed to march by pushing back other groups. The welfare of any nation cannot be at the expense of that of other nations. This needs particular stress because too often in the past the economic progress of certain Western countries has been at the expense of the less advanced countries.

On the basis of this new principle of co-operation, a new world order may be built up. It should, however, have a certain institutional framework. An international economic organisation should be set up, open to all countries prepared to accept these leading principles, and all those States which are willing to join should agree definitely to surrender certain economic questions for decision and administration by a duly constituted International Authority. Once again we must bring about a unified currency and monetary system. The International Monetary Authority should have the ultimate power of controlling both the total supply of money and of expenditure within the member States ; because only then can an active anti-slump policy be adopted. It is not necessary to have the same currency adopted everywhere, although it would be simpler and smoother if all countries have the same monetary unit.

The objective of the International Authority should be to ensure freedom of trade as far as possible, although the right of member countries to control their foreign trade may be conceded, provided certain definite and previously agreed principles of action are adhered to. Freedom of movement of capital should be allowed, although in the case of countries which are socialistic

and where all savings are in the hands of the government, the guiding principle that surplus capital is freely allowed to be lent abroad is difficult of enforcement. In regard to the development of unexploited regions, the policy of open door may be laid down subject always to the over-riding consideration that the resources should be exploited to the benefit of the people living therein. Above all it is necessary that the right of free movement of labour from one country to another should be secured. There may be reasonable conditions imposed in regard to migration, but the dog-in-the-manger policy now adopted by various nations should not be allowed.

A new world order based on free entry to all nations of the West and the East, the advanced and the less advanced, is the only way by which civilization may yet be salvaged. There are, of course, difficulties ahead. Nor is it necessary that all should enter as members of the new organization. Provided the door is kept open, and the policy pursued by this organization is convincingly shown to be in the interests of all, it is bound to be both successful and productive of great good.

ECONOMIC FACTORS IN AGRICULTURAL DEVELOPMENT*

By

K. C. Ramakrishnan

I. *Economic Aims. Handicaps and Incentives.*

The ultimate aim of all agricultural development should be to ensure as high an income as possible for every worker on land, and not merely raise the yield per acre or secure a larger return on the capital invested. Comparisons are commonly made in agricultural publications of acreage yields of particular crops in different countries without reference to the diverse conditions, social as well as physical, in which they are produced. For instance, it is not so well known that in China, which is quoted for high yield per acre of rice and wheat, that the peasant had to sweat more than in any other country on his tiny holding, especially because of the lack of cattle power ; and for manure he has to depend largely on night-soil. In Japan, again, which has next to Italy the highest yield of rice per acre, the tenant cultivator has not only to put in very hard work but he remains for ever in debt on account of the forced use of fertilisers at the behest of his money-lending landlord, and is often obliged to pay off the interest due by sending his children to toil in the small industries run by the same landlord. It is no doubt necessary in old settled countries, where scope for expansion of cultivation is limited and population is already pressing on the soil, that all efforts should be made to raise the yield per acre, if only as a means to raise it per worker. But it is necessary to reckon, in addition to items paid for in cash or kind, the human cost involved in such production. It is not altogether a matter for satisfaction that the Indian ryot " will struggle on patiently and uncomplainingly in the face of difficulties in a way that no one else could ".

The fundamental handicap to the development of Indian agriculture is the smallness of most of the holdings, to which a parallel cannot be found in any western agricultural country. China and Japan alone have tinier farms. Hard work and ample manuring account for phenomenally high yields per acre in these two countries. In the newer lands of America and Australia where cultiva-

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vation is extensive the yield per acre is low, but not the yield per worker. In Western Europe, where holdings are smaller than in America but bigger than in Asia, the yield per worker as well as per acre is high because of intensive cultivation and the efficiency of the farmer. It is only in India that the yield per acre as well as per man is low. Holdings are uneconomic and farmers are inefficient according to modern standards. Our holdings need to be enlarged as well as consolidated to become economic. It is a sign of the low standard that prevails in India that the common conception of an 'economic holding' is different from that which prevails elsewhere. A holding that provides subsistence for the farmer's family is called economic here, while among economists in the West an economic holding generally implies a holding that can fully engage the productive powers of the farmer and his family with the best available equipment. But whatever be the standard adopted, the optimum size of holding would vary with a number of factors: the nature of the crops, the conditions of soil, climate and water-supply, the capacity of cattle, the kind of equipment and the efficiency of the farmer; so that it is not easy to lay down a particular size under all conditions. Granting that the lower, subsistence standard is adopted and sizes are prescribed with reference to particular circumstances, it will not be easy in several provinces to secure even the minimum for the agriculturists who need it, unless perhaps the so-called 'cultivable' lands are all reclaimed. We have little precise data on the nature of these cultivable wastes, of the physical and economic difficulties in reclaiming them. Opinions are on the whole more pessimistic than optimistic. In a country with so much need for further land settlements, it is imperative that the State should set up an expert body to investigate and suggest ways and means of utilising these wastes and alloting them to farmers who show enough evidence of capacity to cultivate them, reserving for the State the power to resume them in case of bad cultivation.

Another evil commonly associated with small holding, but not exclusively confined to it, is the fragmentation of lands of the same holder. A revenue holding in Madras has been called "a conglomeration of fields and sub-divisions in a single village." The big holder has his holding as fragmented as the small one and makes little attempt to consolidate it. Most of the fragments are leased out to different tenants, the holder himself at best retaining a few acres for cultivation by farm servants. A case for fragmentation is often made out on grounds of diversity of soils and variety of

water resources in one and the same village, which permit diversity of cropping and the spread of risks. But surely it would not be difficult to divide all the lands in a village into three or four blocks of arable land of different degrees of fertility or lying in different levels or irrigated by different systems. The re-allocation can be made in such a way that no holder need be refused any particular class of arable land of which he had owned a fragment, unless it was too small and it would be better to allot a compact holding of workable size in one block. No reformer desires to pool wet and dry and garden lands or pasture and wood lands. Every owner of plots in these lands is bound to carry on much better if he gets a compact field in each class of land. This is indeed the *sine qua non* of a number of agricultural improvements—of better animal husbandry in particular. In Europe the open field system with scattered strips of holdings—where, however, a medley of crops in different stages of growth was not permitted as is done on our wet lands—has been doomed for over a century now, though its extinction seems to be a slow and painful process in some countries. The consolidation of fragmented holdings has been brought about in many countries by means of legislation which permitted and aided a majority in an area to have all the holdings properly restripped and alloted, even if a small minority was obstructive. The Punjab has succeeded in consolidating, by the more difficult co-operative methods, about a million acres. The Central Provinces more recently resorted, like European countries, to coercive legislation. Though the law has been enforced in only one Division, the area consolidated exceeds that of the Punjab, which has since enacted similar legislation, though it continues also co-operative methods. Co-operative consolidation is being tried in Madras, but with feeble results so far. Only about 500 acres have been consolidated, all in one district.

Even if the reform is brought about by coercive legislation, it should be realised that consolidation once effected cannot be proof against further subdivision and fragmentation, unless the law and custom of inheritance are changed and other avenues of employment are found for the future generation—whose numbers are bound to grow more and more in excess of the requirements of land, judged by the trends in the growth of population on the one hand and the possible progress of agriculture on the other. In fact, in every country where agriculture has been held in high esteem, there is a striking shrinkage in the proportion of agricultural population to the total population in the last 50 or 60 years. For instance, the

fall in France was from 52 to 40 per cent, in Germany from 42 to 30 per cent, in Denmark from 50 to 30 per cent, and in the United States it has gone down in the last 40 years from 33 to 22 per cent. The same has happened in Scandinavia and Netherlands and in Canada and Australia.

There is a fear that consolidation may mean more rural unemployment on account of the scope it may offer for the use of labour-saving machinery. This is likely; but it only shows up the waste of labour that has been going on. It is also possible, on the other hand, that in a compact holding the scope for labour is widened by the digging of wells and lift irrigation or by the cultivation of more valuable crops demanding along with other things more labour per acre, e.g. sugarcane, plantains, Cambodia cotton, tobacco, fruit trees and vegetables and the production of milk—the demand for all of which is bound to grow with an increase in general prosperity.

In India with land so scarce, capital so shy and labour so abundant and cheap, the scope for the use of labour-saving machinery is limited in the vast majority of holdings, even if they be consolidated. There is a slowly growing demand for a few types of power machinery like the tractor plough, the oil engine or electric water lift, and the sugarcane crusher, which only the bigger landholders can afford to purchase. Even they do not want sowing or harvesting machinery. But the small holders can be encouraged to use less expensive labour-aiding or labour-improving implements like the mould-board iron plough, the seed-drill and the bullock-hoe, on dry soils in particular. It is also possible, if they co-operate, to buy or hire jointly and use in turns the costlier tractor-plough and the cane-crusher. There is little excuse, however, for even smaller farmers in scattered holdings failing to use the better seeds and adopt the methods of conservation of local manures recommended by the Department of Agriculture. The cost in either case is only a trifle higher, and it is the least expensive way of increasing the return from land.

India though old in the art of agriculture is still an infant in the adoption of scientific ways of production and improved methods of economic organisation. These are the means by which European peasants have been repeatedly able to defer the operation of the law of diminishing returns on land. Indian cultivators have still to try so many known improvements in the art (rather the science) of agriculture, that the law of diminishing returns, whose ultimate validity may not be questioned by us, need not be a bug-bear now.

An important negative cause of the slow response of the Indian ryot to the efforts made by the scientists and other agricultural reformers is the lack of stimulus in India comparable to the severe competition felt by peasants of Western European countries in the seventies of the last century from the import of cheap grains from the virgin soil of America. It is this that drove them into new and more efficient lines of agricultural production and co-operative organisation. It is only in the last ten years, that is since the Depression began, that India has come to feel the effect of the growing competition, in foreign and even in home markets, from the tropical possessions of European States which have been most of them developed in the twentieth century. Whether the Depression has, on the whole, depressed more than it stimulated the Indian agriculturist, it is too early to say. But there are not wanting signs of an increased interest on the part of enterprising ryots in certain districts in the improvement of agriculture on modern lines. Strange as it may seem, it is in the proximity of industrial and commercial centres that the greatest progress has been made in the technique and organisation of agriculture.

A more rapid industrial development of India is desirable not only from the point of view of self-sufficiency of the country and an all-round efficiency of the people but also for the relief it will afford to land which is overcrowded and subjected to morcellement by the increasing number of heirs. Not all new industries need be large or giant industries. Village industries might at first be adversely affected, but there would still be spheres in which small scale production would survive and supplement large scale manufactures, if aided by better tools and cheap electric power as in Japan. Not only the artisans, but agriculturists will stand to gain by the adoption of better tools and implements easily manufactured in industrial centres. More chemical manures (the by-product of heavy industries) and more organic manures (the refuse of populous cities) can be obtained for the benefit of agriculture. More capital, managerial ability and skilled labour are easier to procure in an industrial than in an essentially rural environment. Better business methods of credit, purchase, processing and sale are almost always available in urban areas and they can be slowly imbibed by rural folk in the neighbourhood. The market not only for the raw materials of industry but also for staple foodstuffs and agricultural specialities—in particular, fruits, vegetables, eggs, milk and ghee—is greater in a prosperous industrial community than in a predomi-

nantly agricultural society. But for the expansion of industries and the consequent widening of markets, there would have been little development of the dairy or any other intensive form of agriculture in Europe.

Let us not also forget that in Western countries like Germany, Italy and Ireland the impulse and inspiration for rural reconstruction came from leaders, who were not agriculturists but were products of urban civilisation, like Raiffeisen, Luzzatti and Horace Plunkett.

II. *Co-operative Organization of Agriculture.*

It is a melancholy fact that after 35 years of working of the reorganised Departments of Agriculture in India the land under improved varieties is only a fraction of the total area under the particular crops. For instance, of rice and groundnut, the improved strains do not cover more than 5 per cent of the area under each, while of cotton the proportion is 20 per cent. A very important cause of the feeble response made by the Indian ryots to the efforts of the Department is the lack of capital not only for permanent and substantial improvements but even for current cultivation expenses. In fact many of them have not the wherewithal to maintain their families some months after the harvest. The proceeds of the harvest are nearly exhausted in paying off the taxes and rates, in making part payments to creditors, and in buying long needed clothing and foodstuffs not grown on their own lands. All are not able to lay by enough grains and other food-stuffs grown on their very fields for the rest of the year. They sell them at a low price and later on purchase at a much higher price swelling thereby the profits of the merchants. A good harvest is a doubtful blessing as it only enables the money-lender to recover more of his dues.

Not even seeds are preserved for the next sowing by all. If they are, they are not carefully selected. There is either inadequate appreciation of the superior seeds evolved by the Department or inability to buy them. Inability to buy arises partly from lack of funds and partly from lack of such seeds near at hand. Any seeds stocked by merchants or money-lenders are purchased or borrowed at exorbitant rates. Ryots in some tracts have learnt to value superior strains like GEB 24 of paddy and Co_2 of Cambodia cotton. But no agency, steady and reliable, has been organised to multiply those varieties and distribute them at reasonable rates, as trained nursery-men do in western countries. This is a work eminently fit to be undertaken by the agricultural graduates who hanker in vain for salaried service. Seed farms should be organis-

ed on co-operative lines in much larger numbers all over the country. A few stray farms here and there are hardly adequate.

The value of manures, even of chemical manures like sulphate of ammonia, not to speak of concentrates like oil-cakes and bone-meal, is well understood in many wet land and garden land tracts; but ryots suffer from a lack of credit facilities at reasonable rates free from any taint of exploitation, and from the absence of an organisation of their own which will supply these manures free from adulteration and at an economic price. That is why even South India, which is said to be more 'fertiliser-minded,' consumes so little of these manures.

Implements like iron ploughs, seed-drills and bullock-hoes are slowly getting into favour, specially where speed and thoroughness of cultivation are essential, as in the sugarcane and cotton tracts. And yet the number of implements actually sold in South India is far below the number that agricultural and industrial enthusiasts, like Sir A. Chatterton, expected. There is an important physical limitation in our province which makes the problem economically more difficult of solution. We have a variety of soils and climates that call for a variety of implements in different tracts. This hinders standardisation of implements and their manufacture on a large scale, which alone can reduce the costs of production and marketing and facilitate the supply of spare parts.

For over sixty years in Europe co-operative organisation has been considered to be the only means of salvation for petty peasants, as without it the economies realised by larger farms in securing credit, purchasing agricultural requirements, processing and selling produce could not be realised by the smaller farms—though in farming technique the small holders could at least hold their own with the bigger ones in certain lines of farming, e.g. dairy and poultry farming and the cultivation of fruits and vegetables. The supply of improved agricultural requirements was among the earliest type of co-operative services organised in Western Europe. One of the ways to meet the growing competition from the New World was to intensify cultivation by the use of better seeds, manures and implements. The supply of these at reasonable rates and free from fraud was best done by co-operative societies of producers. Another way to meet American competition was to transform the system of agriculture into one of animal husbandry, the disposal of whose products in distant markets was very much facilitated by co-operative processing and marketing. In Ger-

many though Raiffeisen began his experiments with credit societies, he urged them to undertake the supply of agricultural and domestic requisites, the processing and selling of members' produce and to promote the moral as well as material interest of members.

In India the Raiffeisen credit societies had dominated the field of co-operation for over 25 years and eclipsed all other forms of co-operative activity until recently. Yet not more than 25 per cent of the villages have been at all touched by co-operative credit. Even where the Raiffeisen system has spread, for all appearances, the working of the system has revealed a number of grave defects which are the subjects of enquiry by a committee. Over-dues have mounted up with no prospect of clearance in the near future. At least 25 per cent of the old societies will have to be liquidated at once. A new type of society may be tried in these and other villages.

A fatal flaw in the adaptation of the Raiffeisen credit system in India was that loans might be granted for unproductive, if necessary, as well as productive purposes. The rule was liberally interpreted and even ostensibly productive loans were utilised for the clearance of pressing prior debts, which could seldom be repaid within the stipulated period. It took more than a quarter of a century for those in charge of the movement to realise the need for a separate land mortgage banking system to finance long-term credit needs. Here again it is a matter for regret that our land mortgage banks have been so far doling out loans to clear off the prior debts of members, incurred generally for unproductive purposes, rather than helping them to effect permanent improvements on land or equip the farms with durable machinery. Provision has been recently made for loans for the sinking of wells, the installation of oil engines or electric plant for lifting water or crushing sugar-cane etc., but as yet little has been done. The demand for such loans does not easily come from the ryot. It is for the banks to take the initiative and educate the cultivator in the better use of long-term credit facilities. The Government has been for over 55 years offering what are known as Taqavi loans for permanent improvements; but for a variety of reasons, such loans are hardly popular with the ryots. Taqavi loans have also been granted for short term cultivation expenses, but not in normal years generally. The recent practice in Madras of entrusting the grant of such loans to the officers of the Agricultural instead of the Revenue Department is a welcome change.

Agricultural improvements have seldom constituted the real purpose of a co-operative loan, either short-term or long-term. So, whatever may be the technical success of some of our co-operative credit institutions from the purely financial point of view, it cannot be said that the earning capacity of our agriculturists has been increased.

In India rural credit societies, modelled as they were on Raiffeisen's, had among the objects provision for the supply of the agricultural and domestic requirements of members, the purchase and hire of machinery for the use of members, the sale of members' produce and the dissemination of the knowledge of the latest improvements in agriculture and handicrafts. This imposing array of aims was seldom taken up seriously, and there were not even a hundred out of 11,000 rural credit societies in the Madras Presidency that supplied or encouraged the use of improved agricultural implements, manure and seeds. The *ad hoc* supply societies were small and spasmodic in functioning. The Loan and Sale societies, of which there were more than a hundred, did supply some improved seeds and manures. There were also a few Agricultural Improvement Societies that had supply as one of their functions and did business to the tune of Rs. 1·4 lakhs for the whole Presidency for a year. Other Provinces did not have a more creditable record in promoting agricultural improvements and supplying the requirements of modern agriculture. This is in striking contrast to the work done by co-operative societies in Western European countries and Japan. The Agricultural syndicates of France and the societies of peasants in Belgium, guided by the Catholic clergy, have done more to improve agriculture than departments of State. In Japan, though co-operative societies were not pioneers of new agriculture, 80 per cent of the 15,000 agricultural societies supplied seeds, fertilisers, implements, etc. to the tune of 70 million yen or Rs. 5 crores per annum—for a country with but 18 million acres of cultivated land.

Whether it is wise to separate supply from credit societies in view of the scare the enforcement of unlimited liability has created in the minds of well-to-do ryots or to stick to multi-purpose societies in view of the lack of human material to manage a variety of societies might be a moot point in India. But, whether alone or in combination, the supply of agricultural requirements was among the most important activities of co-operative societies in Europe and abroad. So powerful have some of the societies grown that in a number of countries they have through their wholesales taken up

the manufacture of implements and manures and even the multiplication of seeds for distribution to members.

Marketing of agricultural produce in a raw condition was the most difficult and the latest of co-operative ventures to succeed in Europe. As long as produce was neither uniform nor graded and it met a local want, it was difficult to make a success of co-operative sale. Producers of better quality would not accept the same price as for inferior crops and it was difficult to pool produce of different members. The Society could not negotiate for a better price with uneven qualities and it was often left with unsaleable surpluses of members' produce. Production did not improve until a free and sure flow of surplus produce to the world's market was secured for the farmers. But the outside world would not care for produce that was not improved. This vicious circle was broken by leaders who organised at the same time co-operative sale and agricultural improvement.

Of all attempts at co-operative sale that have so far been made in India, the most successful are those of cotton sale societies particularly in Bombay and Madras—judged by the volume of sales and profits earned for producers. The success of these societies has depended largely on the response made by producers to the efforts of the Agricultural Department to spread improved strains of cotton. Some of them indeed started as seed societies, controlled and guided by the officers of the Department of Agriculture, who naturally strove to find buyers of the new cotton at higher prices than of the older varieties. Even after conversion into sale societies, they did not give up the work of spreading new varieties, for which they received some subsidy from the Indian Central Cotton Committee. The Agricultural Officers supervised cultivation work and also graded and classified the cottons. Such graded cottons naturally commanded higher prices. They would not do so unless the varieties were very widely adopted and a large and steady supply of uniform quality were pouring into the market systematically. Small quantities offered by a few individual improvers could not withstand the competition or boycott of a ring of merchants. Indeed such breakdown would be a setback to agricultural improvement in the tract. There is thus an intimate connection between co-operative sale and agricultural improvement.

Co-operative sale of milk is coming into prominence in the cities and large towns of India. The usual organisation is the milk supply union with its headquarters in or near the city to which are affiliated a number of societies in the neighbouring villages with

members having cows or buffaloes, more often as a sideline to agriculture. The milch cattle live under better conditions than in the congested city environment and the quality of milk is richer. But conditions of transport are far from satisfactory and pasteurisation of milk done at headquarters in the bigger unions is not as effective as it would be if conditions of transport and of handling in the initial stages in villages were better. The more serious handicap is the continuance of milch cattle in the city, which really ought to be shifted to rural tracts in their own interests as well as in the interest of public health. A great deal of improvement in the methods of breeding milch cattle and of growing fodder is necessary before the milk supply can be made a paying proposition for producers and brought within the reach of masses of poor consumers in our country. The help of a host of livestock and agricultural experts would be needed if the problem of milk supply should be satisfactorily tackled by co-operative organisations. Co-operative supply cannot for long compete with private suppliers and survive them without a vigorous programme of improvement of breeds and of fodder supply. This programme cannot be carried out in a country where the individual herd is so small without a co-operative organisation of producers. Animal husbandry is bound to be a sideline to the growing of cereal or other crops in most parts of the country and especially in wet land areas. To be economic and to utilise the by-products of the farm, the individual herd must be small, especially where draught cattle have also to be maintained.

Outside India the most successful of agricultural co-operative societies is the society for production and sale, the earliest and the most typical of which is the co-operative creamery or dairy. The surplus milk in rural tracts, far removed from populous centres of consumption, is converted into butter and sold abroad by the butter export organisation which could bargain for the best price. The skimmed milk is returned to members for feeding the pigs kept for bacon production—invariably a by-industry in the dairy tract. Denmark was the earliest home of the co-operative dairy where all the butter produced was exported, through a bottle neck as it were, to Britain. Later on other countries in Europe and overseas have developed a formidable dairy industry mostly on co-operative lines. India, however, does not have any dairy society of the Danish model. Our demand is not for creamery butter but for ghee. Cold drawn creamy butter does not yield good ghee; it becomes waxy and does not have the grain or flavour of home-made ghee, and it does not keep like the latter.

The supply of pure ghee is far short of the demand and with the advent of hydrogenated and refined vegetable oils like Marvo, adulteration has become far too tempting. There is practically no pure ghee available in the urban or even in the larger rural markets. Ghee societies have been organised in the United Provinces which merely collect and sell the ghee made at home by individual members. It is doubtful whether with the best precautions of societies and even good intentions of members, genuine ghee can be collected and marketed. In our view large quantities of uniform, clean and pure product can be guaranteed only when ghee production becomes amenable to centralised manufacture as in the case of butter in Denmark. The Imperial Dairy Institute's method of making ghee by the use of citric acid is claimed to yield better and more ghee compared with the country method 'of natural souring.' Making of ghee direct from cream by heating it in a special boiler is also in the experimental stage. If these experiments are successful and good ghee can be made on a large scale and use be found by propaganda and otherwise for all the skimmed milk and buttermilk—not so well relished now—the day will not be far distant when we may have a flourishing ghee industry more or less on the model of the Danish Co-operative Creamery.

There is a strong case for the co-operative manufacture of sugar or at least cream jaggery from sugarcane. South India is better fitted to grow the best varieties of cane than Northern India but it has a disproportionately small acreage under cane. A formidable obstacle to the expansion of the area is the difficulty of the disposal of cane after it is harvested. There are not enough factories to absorb the canes at a reasonable price. If it is too much for small farmers to establish a factory of their own on co-operative lines as at Vuyyur, it is up to them or to their well-wishers to organise smaller jaggery making societies with power crushers and improved furnaces. Not only would this reduce the cost of production of jaggery and thus stimulate the market for it, but it could help the producers concentrate their attention on cultivation.

There is ample scope, and from the point of view of agricultural improvement great need, for the co-operative ginning and pressing of cotton and decortication of groundnut. Success in these lines has been demonstrated in Bombay and Madras. What is needed is further extension.

III. *Effects of Land Tenure and Taxation.*

Conditions of tenure and taxation of land play an important part in promoting or impeding agricultural improvement. For

more than a century in Great Britain leadership in farming was in the hands of landlords who had enlarged and enclosed their estates by buying off the numerous strips of yeoman farmers, often with the profits made in trade, and invested capital in long-term improvements like drainage works and farm buildings and did pioneer work in the cultivation of better crops and the breeding of pedigree stock. It is the success of these ventures that made Britain the pioneer of modern agriculture, as well as of large-scale manufactures. This period of prosperity lasted for over a century —from 1750 to 1870. After 1870, however, American competition killed cereal farming; there was a continuous fall in rents, while the cost of cultivation, particularly wages, increased. Arable farming gave place to grass farming and stock-raising. Industries were more paying than agriculture. Industrial magnates bought land more for its amenities and social prestige than for its profits as a farm enterprise or for the love of agricultural research. Research indeed passed into the hands of several specialists and it was beyond the capacity of any landlord to set himself up as a leader in science or technique. Continuous increase in income-tax and death duties led to the break-up of big estates and many old farmers became, in the first thirty years of this century, occupying owners with the help of the State. But a decade of falling prices has impoverished these owners too, who have little capital left to work their farms. Small holdings in certain specialised lines of agriculture like dairying, fruit culture and vegetables are still favoured, but for staple cereals large scale mechanised farming with State ownership of land and control of cultivation is advocated.

It is strange that when such radical changes have been going on in Britain for many years now, so many British administrators coming over to India even in recent years should harp upon the British tradition of landlord-leadership in scientific agriculture and appeal to the landed aristocracy in India to give a lead in agricultural improvement.

We can understand Lord Cornwallis, the author of the Permanent Settlement in 1793, expressing the hope that the zamindars (in Bengal) would exert themselves to spread and improve cultivation in their estates, of which they had just then been made proprietors and assured immunity from enhancement of *peishkush* which they had agreed to pay. He had evidently in his mind the contemporary English 'improving landlord.' Some zamindars no doubt had the jungles cleared, canals cut, tanks dug, and temples and ghats built.

The area of cultivation was extended. But there were few zamindars either in Bengal or in other provinces, where the Permanent Settlement was soon after introduced, who took any active interest in cultivation, even on their own home farms, of the better types of crops with better implements and fertilisers or in the improvement of livestock, the breeding and rearing of which were carried on by backward tribes. Most of the zamindars went on rack-renting with the growing competition for land, using their power to evict tenants as a lever to enhance the rents. Even after the enactment of tenancy laws, the provisions for the commutation of kind rents, for the occupation of old wastes, and the summary recovery of dues were all abused to such an extent that tenants have been crying for reduction of rates to the levels prevailing in neighbouring ryotwari areas, which are themselves quite high.

The abuse of the system reached its worst in Bengal, where most of the zamindars became absentee landlords and a series of intermediate tenure-holders with rights of their own have sprung up between the zamindars and the actual tillers of the soil. The ryots in other zamindari tracts too are not all cultivators; many of them let out their lands, of which they have now occupancy rights, to impecunious labourers for a fixed or sharing rental. Such a dissipation of interests in cultivation is not conducive to any improvement in agriculture.

Nor are all the ryots in ryotwari areas cultivating their holdings. Big as well as small ryots have mostly fragmental holdings; little or no attempt is made to consolidate and improve them; and the different fragments are generally sub-leased to different petty tenants-at-will, most of whom live on the margin of subsistence. Those who cultivate on the *varam* or crop-sharing tenancy system —analogous to the metayage in Europe—either as tenants of zamindars or of ryots have the least incentive to effecting any improvement. Where, however, fixed cash leases are the rule, as in the case of valuable commercial crops, and the tenants are men of resources and spirit of enterprise, they invest capital in the purchase of better seeds and manures. Except in the case of tree crops, as in Malabar, such tenants are not anxious to stick to the cultivation of particular pieces of land. They move from one land to another paying rents according to soil, irrigation and market facilities.

The Royal Commission on Agriculture pointed out incidentally —land tenure was outside the terms of reference—that large scale

farming 'though open to many is practised by few'. Among the reasons given, tenancy legislation, the primary object of which was to confer security of tenure on ryots in the estates, is said to have rendered it difficult for large land-holders to obtain unrestricted possession of compact blocks of land. But we wonder if many of them are yearning to practise scientific farming for the benefit of themselves and their ryots, after missing splendid opportunities to set up model home farms in the past.

Sir John Russell reviewing the progress of agricultural research and its application in India in 1937 lamented the lack of an agricultural aristocracy analogous to the British landlords or the large farmers, "rooted in the soil and ready to try any improvements suggested by experimental stations and anxious themselves to devise improvements, which are sometimes better than those of the experimental stations." Whatever the past might have been, recent investigations like those of Astor and Rowntree tell a different and distressing tale of large farmers in Britain.

In respect of dairy industry again, Mr. F. Ware, an authority on animal husbandry, has suggested that "the wealthy landowning classes of the country might give their support by maintaining high grade herds of pure bred indigenous dairy cattle and by supplying approved sires for use in the villages."

Agricultural reform in other European countries took a different turn from that in England. After the Napoleonic wars, measures were taken to abolish serfdom on land in most of the Western European countries; and the Code Napoleon established equal inheritance of land among all the sons of a father. With the growth in population in the 19th century holdings naturally tended to become smaller in size. There were few landlords left of the type of English landlords, except in East Prussia. In fact the State offered little encouragement for the growth of big estates, while steps were taken to break them up and settle the workers as proprietors. Consolidation of fragmented holdings was effected by permissive legislation in most countries and the subdivision of holdings below the minimum economic unit was prevented by law. There was indeed little of the worship of the large estate as in England, though the economies of large-scale production and marketing were before long appreciated. Such economies were effectively realised by the variety of co-operative organisations, most of which were inspired by the spur of necessity to meet the American competition. It was found that in respect of production in certain

lines, small holdings were by no means inferior to large ones, and much of the land was devoted to such specialities. The processing and marketing of such crops demanded more of co-operative effort, and hence it is that all over Western and Northern Europe, co-operation has been treated as a necessary complement to peasant proprietorship. For instance, in Denmark it is not the big farmer that is reputed to breed and rear good cows. More than 90 per cent of the herds consist of less than 15 milch cows each. Though Denmark took up the development of dairy breeds long after England, the red Danish cow is not inferior to any English breed in respect of yield of milk and butter fat. This has been achieved by the co-operation of the State department and the peasant co-operatives for milk recording etc. Progress has been achieved in smaller lines—in the production of oats, barley and potatoes by Belgian peasants and in the raising of wheat, fruits and vegetables by the Dutch peasants almost entirely by their multifarious co-operative organisations. Scandinavian and Baltic States achieved equally remarkable progress by co-operative methods. An agrarian reform amounting to a revolution was effected in Central and Eastern States of Europe after the last war by the conferring of ownership rights on cultivators and by the break-up of big estates, which were not fully compensated ; and even here co-operation was called in to the aid of the new peasant proprietors.

With such splendid models before them of progress achieved by peasants co-operatively organised, we wonder why the British authorities should still go on appealing to effete landlords instead of earnestly helping to build up a sound, all-round, co-operative movement, which has been the greatest instrument of agricultural progress all over Europe. Perhaps as Mr. L. D. Gammans of the Malayan Civil Service says : "The Englishman in the East is probably more ignorant of co-operation than most other Europeans. With the exception of consumers' store, which does not appeal to any great extent to the educated classes from which the British official is largely recruited, co-operation in Great Britain is little developed. The ordinary Englishman is apt to know little of its other possibilities and is less conversant with the co-operative organisation of agriculture than the German, the Dutchman, or the Dane."

Though peasant proprietorship is, on the whole, the best system of tenure in India where capitalistic or socialistic large scale farming is out of the question on account of the nature of crops,

the scarcity of land and the abundance of labour, it is neither possible nor desirable to do away with tenant-farming. There are good cultivators who do not like to have their little capital locked up in the purchase of land, which is better used in working the farms that they take up for lease from time to time. An impartial tribunal that will fix up fair rents and compensate for loss for any premature eviction, combined with facilities for co-operative credit, supply and sale would for them be ample substitutes for the 'magic of property' in land.

In fact co-operative societies may be organised by tenants who can take on lease a large piece of land or several pieces from one or more landlords. Joint farming may be tried or at least an attempt may be made to consolidate cultivation units and each member may take charge of one unit. The bargaining power of such co-operative ventures will be greater than that of petty individual tenants competing among themselves. The advantage may not be on the side of tenants alone. Many an absentee landlord and institution owning land, not to speak of reasonable local landlords, would be pleased to deal with a well-knit co-operative organisation than with a number of poor tenants. Agricultural graduates can play a great part if they can organise and manage such societies taking on lease the lands of temples, endowed charities and institutions and the lands that have come into the hands of co-operative banks, insurance companies, etc., even as their confreres in America have organised themselves into agricultural management companies for a similar purpose. They can serve as managers and share the profits of the enterprise with all the working members. They can set a higher standard of cultivation and reduce the evils of a recklessly competitive and wasteful tenancy system.

Land revenue in ryotwari areas, assessed on the theory of State landlordism and revised only in 30 years, was felt to be a heavy burden even in periods of rising prices. It is certainly oppressive in a period of falling prices and intolerable in years of drought, when remissions are by no means liberal. At any rate the rigidity of the rate with no automatic provision for remission in years of scarcity of rains, or of fall in prices, is not conducive to the investment of capital in agricultural improvements except of the kind, like sinking of wells for which provision has been specially made for exemption from enhancement of rates. This exemption has surely given a great fillip to the digging of wells and the mechanical lifting of water in some districts. The exemption need not indeed be permanent, but may be reduced to a period of 30 or 40 years as in the Punjab, without detriment to improvements.

The comparatively well-off ryots dissipate their extra earnings got in years of better yield or higher prices, or divert them to the purchase of more land rather than invest them in any substantial improvements on the land they already have. Agricultural experts should look for such opportunities and induce such earnings to be invested in improvement of land or purchase of plant like the water-lift, tractor-plough, cane-crusher etc.

Land revenue is said to be a tax on land and not on persons and is being imposed on all alike. It is a regressive tax pressing unduly on the poor, who have in good years little left to spend on improvements. Taxation of higher agricultural incomes, over and above a reduced flat rate of revenue, is bound to be introduced in all provinces, as it has already been done in Bihar and Assam. With a view to encourage greater productivity on land, concessions may be shown for improvers of land and crops by making liberal allowances for expenditure on improvements of approved types.

The existing system of taxation of water is not scientific and it leads to a lot of waste of water and injury to the land. But volumetric taxation of water would be costly to administer without a system of co-operative distribution of water among the users. Exemption of charges now granted for the use of water in growing green manure crops may well be extended to use of water for raising fodder crops in areas with a deficiency of fodder. A part of the local land cesses now spent by local bodies on a variety of objects may be earmarked for agricultural improvements by the organisation of propaganda, demonstration and systematic instruction by itinerant teachers employed by District Boards, even as County Councils are doing in Great Britain.

Export duties on manurial resources like oilseeds, bones and fish have been time and again recommended by agricultural experts with a view to bring down their prices and induce greater use within the country, so as to conserve soil fertility and produce better yields. Such duties might in the first instance hit producers of such materials, though the merchants would be hit more; but in the long run they would stand to gain by greater demand within the country and the reduction of middlemen's profits in internal trade.

Import duties on competing foreign produce with a view to stabilise the prices of home produce have been freely resorted to in almost all European countries. But for over a century the free trade policy of Great Britain has stood in the way of any similar

protection to her crops, and incidentally to our crops too even when the need has been felt for it in recent years. South Indian producers, having to incur greater costs of cultivation on older soils and irrigated lands, have been crying in vain for protection from Burma and Siam rain-fed rice and Ceylon plantation copra. The greatest and the most successful departure from free trade tradition has been made in the case of sugar—though more in the interests of manufacturers than of cultivators—and this accounts for the sudden expansion of sugarcane area even in South India, which really is better fitted to grow cane than North India, but suffers from want of factories to absorb the canes grown. An extension of such protection to other crops may be opposed on the score of the poverty of consumers. There is also the danger that it may remove an important spur to improvement; for the temptation to go to sleep behind the tariff wall is greater in this country.

This course of lectures, it is hoped, has brought out the dominant importance of the economic factors in the development of agriculture, which educational and research workers will have to take into account. Nowhere has the importance of agricultural economics been so well recognised as in the United States. It would, therefore, be fitting to conclude this course with an extract from a statement made twenty years ago by H. C. Wallace, the famous Secretary of Agriculture, who organised the Bureau of Agricultural Economics.

> "Help in their economic problems is now the most urgent need of our farmers. This is not to say that the Department is losing sight of production matters. The farmer needs all the help in his production problems that the Departments of Agriculture, Colleges and experimental stations can give him; but the need of the most importance now is the development of an entirely new realm of organized knowledge bearing upon the economic factors of agriculture, looking towards cheaper production, improved methods of distribution, and the enlargement of markets, all to the end that the prices the farmer receives shall be more fairly related to his cost of production."

STUDIES ON THE CHEMISTRY AND BIOLOGY OF PONDS IN THE MADRAS CITY

Seasonal Changes in the Physical and Chemical Conditions of a Garden Pond containing abundant aquatic vegetation

By

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1. *Introduction*

In my paper on "The Ecology of a temple tank containing a permanent bloom of *Microcystis aeruginosa*" I have explained the object of these studies. The pond now under investigation typically represents the first of the three groups of ponds found in Madras, namely, those containing abundant floating and submerged macrophytic vegetation: and it may therefore be compared to the littoral region of temperate lakes or swamps of the tropics. They are sources of serious trouble to the Municipal Corporation as they afford breeding places for the larvae of malarial mosquitoes. They are also of great scientific interest inasmuch as they contain scarcely any phyto and zoo-plankton. The seasonal variations in the physical and chemical conditions of their waters are not so well known as those of lakes (Carter and Beedle 1930-32) and this aspect of the subject has been comparatively neglected in India (Bharadwaja 1940). An attempt has therefore been made in this paper to trace the changes during a year in one of the garden ponds of Madras.

This pond is situated mid-way between the office building and the Hostel attached to the Y.W.C.A., Vepery, Madras; and is nearly rectangular in shape and measures about 300 feet long, 150 feet broad and 4 feet deep at full pond level. Its bottom is almost flat so that its depth is nearly uniform at all places in the pond. On the east, north and south, tall trees with leafy branches cast their shadows, while the west end is open. It receives the drainage from the kitchen and the bathroom of the hostel, throughout the year. Also, it gets filled up during the north-east monson season, when the storm water from the compound is allowed to drain into it.

Quite possibly, it may also receive a small quantity of spring water. Its banks are grassy and vary in width during the different seasons of a year. At full pond level, the outer margin slopes rather sharply towards the water. Its bottom is covered with soft accumulated deposits of organic debris in most places.

Observations on the physical and chemical conditions of the pond water and on the nature of its aquatic vegetation were made once a fortnight or more often once a month between February 1934 and January 1935. Samples of water were collected just below the surface of water from nearly one and the same place on the eastern side between 9 and 10 a.m. The results are shown in Table II. Table I contains the meteorological data of the period covered by the invesitgation.

2. *Meteorological Notes*

(a) *Temperature.*—The average daily temperature of the atmosphere varied from a minimum of 74·9°F (in December) to a maximum of 87·5°F (in May). There was a gradual rise from February to May when the maximum for the year was reached and from May onwards there was a gradual fall till December, when the minimum for the year was reached. There was a rapid rise from the end of the cold weather period to the beginning of the hot weather period; but there was a sudden drop from the end of the hot weather period to the beginning of the south-west monsoon season, and also from the end of the south-west monsoon season to the beginning of the north-east monsoon season.

(b) *Hours of bright sunshine.*—The number of hours of bright sunshine varied from a minimum of 5·6 (July) to a maximum of 10·8 hours (February and May). The hours of bright sunshine varied between 9·7 and 10·8 during the hot weather period; betwen 5·6 and 8·0 during the south-west monsoon season; between 6·4 and 7·9 during the north-east monsoon season and between 7·6 and 10·8 during the cold weather period. The maximum number of hours was recorded during the hot weather period and minimum during the south-west monsoon season.

(c) *Percentage of cloudy day.*—The percentage of cloudiness varied from a minimum of 28 (February) to a maximum of 83 (July). The sky was most cloudy during the north-east monsoon season and least during the cold weather period.

(d) *Total Rainfall.*—The rainfall varied from a minimum of nil (February) to a maximum of 16·82 inches (October). There was

a gradual increase from February to October when the maximum for the year was recorded and thereafter there was a considerable decrease. Maximum rainfall was recorded during the north-west monsoon season and minimum during the cold weather period.

(e) *Wind Velocity.*—The velocity varied from a minimum of of 152 miles per day (February) to a maximum of 235 miles (December). A gradual increase in the wind velocity was noticed from February to May, when the first maximum was reached; from May onwards, there was a decrease till August; and again from August there was a rise till the second maximum was reached in December. From December 1934 to January 1935 there was a decrease.

3. *Aquatic Vegetation*

There were two types of vegetation, in the pond; floating and submerged. The former was represented by two members of Nymphaeceae—the yellow water lily, Nuphar and the white water lily, Nymphaea—and the latter by *Hydrilla verticellata and Najas flexilis.* On 8th March, the lilies were found to cover nearly the western half of the pond, while they were found growing scattered in the eastern half. This condition prevailed till 2nd August when all the plants were found to have been removed. They were seen again growing from 6th September to 30th January in the same manner as observed on 8th August.

As regards the submerged type of vegetation, the most dominant plant was *Hydrilla verticellata,* which was found to cover the entire bottom of the pond. Next in order of abundance came *Najas flexilis,* which was found growing more in the western than in the eastern half of the pond.

Rotting vegetation of *Hydrilla, Najas,* and *Spirogyra sp,* was seen all round the water margin on 27th April, May and June when the level of water was very low. All the plants were found to have been completely removed on 14th June and again on 22nd August by the Health Department of the Corporation. They were found growing again from 6th September to 30th January 1935.

4. *Physical Conditions*

1. *Temperature of water.*—Table II shows that the amplitude of variation was from a minimum of 25·8°C in December to a maximum of 32·4°C in April. The temperature curve showed a gradual rise from February to April followed by a fall till August,

when there was a rise again accompanied by a fall. The temperature changes of the water seemed to follow those of the atmosphere.

2. *Colour.*—It was brownish and clear throughout the year.

5. *Chemical Conditions*

1. *Dissolved oxygen.*—The oxygen content was found to vary from a minimum of 2·30 cc/1 on 22nd August to a maximum of 10·03 cc. on 21st June. The water was found to be supersaturated on 22nd February, 21st June, 14th July and 23rd November. The oxygen content was fairly high in the hot weather and in the first half of the south-west monsoon season, and lowest in August and high again in the north-east monsoon season.

The fluctuations in the oxygen content of the pond water did not seem to follow the law of solubility of gases. A careful study of the temperature and oxygen curves shows that with the increase of temperature oxygen also increased on 27th April and 19th September; and with the decrease of temperature oxygen also decreased on 26th May, 8th and 22nd August. From the above it would appear that the law of solubility of gases was not the deciding factor. This point is clearly illustrated by the oxygen saturation graph also. Therefore, the explanation for the observed variations in the oxygen content has to be sought in the respiratory and photosynthetic activities of the vegetation and in the content of organic matter in the pond.

The amount of dissolved oxygen, generally, was high from 22nd February to 14th July while it was low in August and September. It was not so high in the north-east monsoon season as in the cold weather and hot weather periods, when the average number of hours of bright sunshine was higher. This observation therefore, would seem to indicate the dependence of dissolved oxygen upon the intensity of bright sunshine, when the submerged plants are able to carry on active photosynthesis.

Another factor of importance which accounts for the presence of large amounts of dissolved oxygen, in a piece of water, is the abundance of chlorophyll-bearing plants. The greater their abundance, the greater the photosynthetic activity, and consequently the greater the possibility of the production of oxygen. As has already been stated, this pond water contains an enormous amount of macrophytic vegetation resembling an East African Swamp, in a shallow depth of water. The supersaturated condition on 22nd February, 21st June, 14th July and 23rd November can be ascribed only to predominance of the photo-

synthetic activities of the plants over their respiratory activities. Again the high oxygen content viz., 6·68 cc/1 on 23rd November, when the water was supersaturated (153·7%) shows that the photosynthetic activity was greater than the respiratory activity even in the north-east monsoon (October to December). On other dates, consumption of oxygen exceeded production. This fact would show that the processes of absorption of oxygen dominated over those that discharged it, and that unfavourable conditions for photosynthesis were present on those dates. Decomposition of organic matter rather than its synthesis was possibly then going on in the pond.

2. *Free Carbonic acid.*—Excepting on one occasion free carbonic acid was absent throughout the period of investigation. Its presence on 22nd August has to be attributed to the thoroughly altered conditions of the pond water resulting from the removal of all the plants from the pond, a few days prior to the day of sample collection. Its absence on all other days may be explained as being due to its utilisation by the abundant macrophyta, or to the high temperature of water with the consequent liberation of carbon-dioxide into the air (Welch 1935).

3. *Hydrocarbonates and Bicarbonates.*—The hydrocarbonates varied from a minimum of 0·3 part on 6th September and 26th October to a maximum of 4·80 parts per 100,000 on 27th April 1934. They were found to increase generally from the cold weather period to the first half of the south-west monsoon season and to decrease thereafter.

Bicarbonates varied from a minimum of 0·92 part on 22nd February to 17·54 parts per 100,000 on 22nd August. They were least during the cold weather period and highest during the south-west monsoon season. They increased from the cold weather period till the maximum was reached in the south-west monsoon season, and were found to fluctuate during the rest of the year.

From a study of the figures for carbonates, bicarbonates and dissolved oxygen, the whole year can be roughly divided into two periods; the first period i.e., February to July when the carbonates were high, bicarbonates low (exceptions being June and July) and dissolved oxygen high and the second period i.e. August '34 to January '35, when the carbonates were low, bicarbonates high and dissolved oxygen low. The former may be considered as one of very active photosynthesis or as a period of greater formation than destruction of organic matter and the latter as one of mild photosyn-

thesis or as a period of greater decomposition than formation of organic matter, from the viewpoint of oxygen saturation of water.

4. *Hydrogen-ion concentration (pH)*.—The pH values varied from a minimum of 8·2 on 6th September to a maximum of 9·3 in April and May. They were highest in the hot weather and in the first half of the south-west monsoon season, and lowest in the latter half of the south-west monsoon and north-east monsoon seasons. It is well known that the pH value of a piece of water is influenced by the amount of carbonates of calcium and magnesium and the CO_2 tension. The latter in its turn is influenced by temperature, and the photosynthetic activity of the vegetation and animal life in the water. In the pond under investigation, excepting for larvacidal fish introduced into it for destroying malarial mosquito larvae, animal life was poor, so that the chief factor controlling the pH appears to be the vegetation.

The data for pH and temperature of the water show that the former increases in the hot weather and in the first half of the south-west monsoon season, when the latter is fairly high (over 30°C). The maximum pH values are followed by a fall in the second half of the south-west monsoon season, when the temperature of the water is generally less than during the former periods. It would, at first sight, therefore, appear that changes of temperature control the pH values of the water in the pond.

That it was not really so, is shown by the results for temperature and dissolved oxygen on 22nd August and 6th September, 25th October and 23rd November and 13th December and 30th January '35. The decrease in pH, especially in the second half of the south-west monsoon and north-east monsoon seasons might be due to the rotting vegetation, which had increased the bicarbonate content. Not until February, however, is there a sharp rise in pH indicating greater assimilatory activity of the chlorophyll-bearing plants in the water. Again, the high pH values (8·2 to 9·3) of the pond water should be due to the same cause by which calcium carbonate is precipitated and pH 9·0 is reached (Atkins 1922).

Atkins and Harris (1924) have taken the criterion of saturation of their tank water according as its pH values were at or always above 8·1. This pond water whose pH values have always been above 8·1, must be considered, according to that criterion, always saturated or supersaturated with oxygen. But it was not so saturated. Excepting on 22nd February, 21st June, 14th July and 23rd November, it was under-saturated on all other dates. These observations show that no such generalisations as has been made by

Atkins and Harris can be made in the case of ponds which contain excessive aquatic vegetation. A conclusion similar to mine has been arrived at by Kolkwitz (1914) and Pearsall (1923).

The data for pH, carbonates, bicarbonates and dissolved oxygen show intimate relationship on a few occasions. On the 11th April, 19th September, and 23rd November there was an increase in oxygen, carbonates and pH and a decrease in bicarbonates over the corresponding figures for 27th April, 6th September and 25th October.

5. *Total Solids.*—The figure varied from a minimum of 30·6 parts on 22nd March to a maximum of 117·6 parts per 100,000 on 22nd August. There was also a seasonal change, which was high during the latter half of the south-west monsoon season and low during the hot weather period. The decrease in March, April and May was probably due to the precipitation of the carbonates of calcium and magnesium, and the increase during the south-west monsoon season (June to September) to the dissolution of the precipitated carbonates of calcium and magnesium by carbon dioxide which resulted from the decomposition of organic matter by bacterial action.

A study of the data for solids and pH confirms the above conclusion. When the pH is high (9·1 — 9·3) as in the hot weather period, the values for total solids are low, and when the pH is low (8·2 to 8·4) as in the latter half of the south-west monsoon season, the values for total solids are generally high.

6. *Total Hardness.*—The figure varied from a minimum of 12·0 parts in March, April and May to a maximum of 32·0 parts on 22nd August. It was the same (12·0 parts) during the hot weather period and gradually increased in the south-west monsoon and decreased during the north-east monsoon season.

The low figures in the hot weather period were due to the precipitation of the carbonates of calcium and magnesium due to photosynthesis by the aquatics in the water; and the high figures during the south-west monsoon season to increase in the content of bicarbonates ; and the low figures again during the north-east monsoon season to dilution on account of rainfall.

7. *Phosphates.*—They were found to vary from a mere trace or nil on 14th July to a maximum of 0·006 on 13th December. They were very low from March to August and high during the rest of the year. Throughout the year their production continued from excessive plant remains by bacterial action. Carter and Beadle (1930-32) found that the concentration of phosphates was

higher in the tropical Paraguayan Chaco than in temperate lakes of the same type, and Carter (1932-34) reported that they were absent from the open water of the tropical East African swamps.

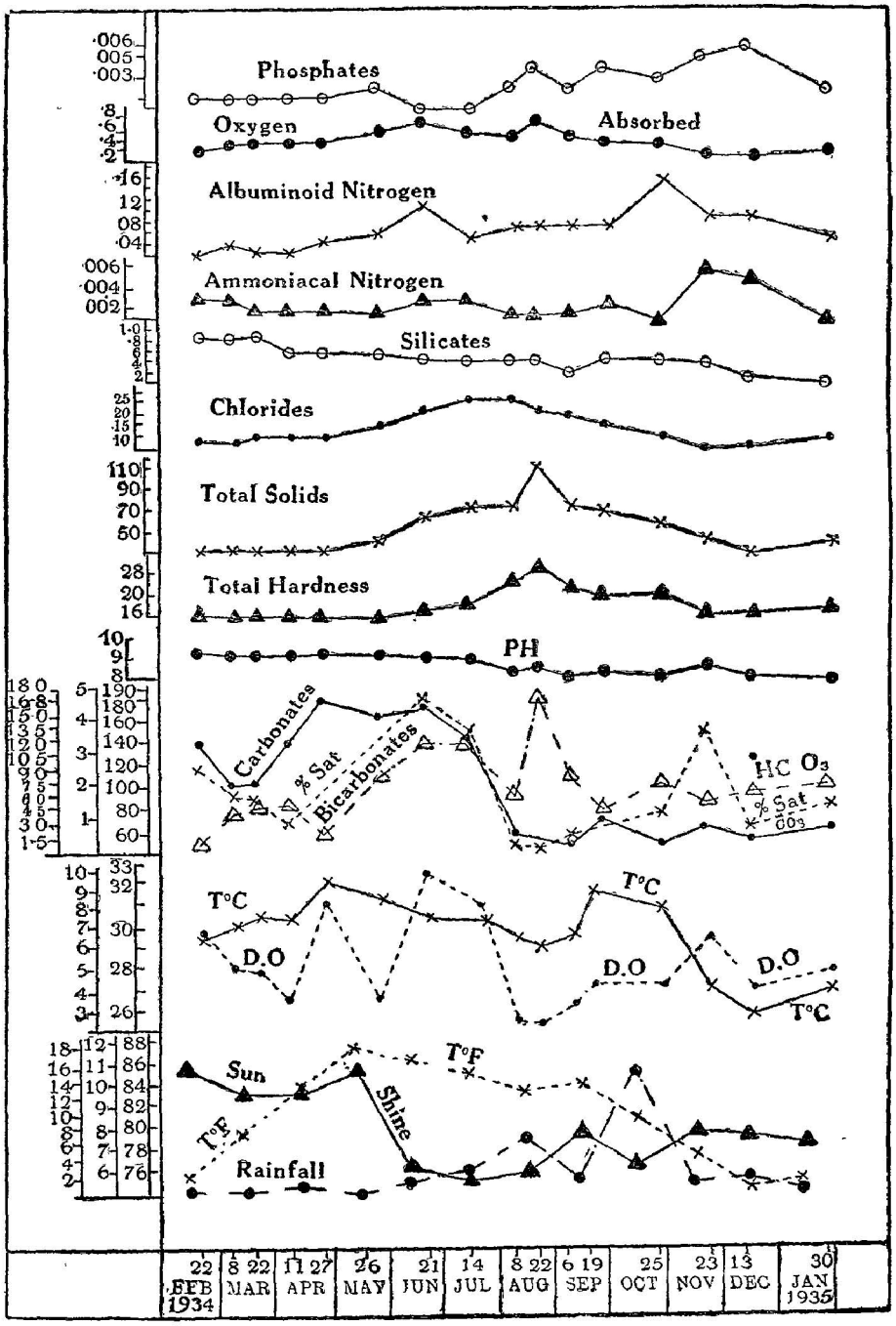
8. *Silicates.*—These were found to vary from a minimum of 0·16 part in January '35 to a maximum of 0·90 part on 22nd March '34. They were high during the hot weather and south-west monsoon seasons, when the water was more alkaline and low during the north-east monsoon season when the water was comparatively less alkaline. Also one should expect a greater amount of silicates on account of the high alkalinity of the pond water, but the quantities were not really very high. "It is probable that the temperature changes affect the solubility of the soil silicates and their rate of hydrolysis resulting in the precipitation of silica" (Atkins and Harries l.c.).

9. *Chlorides.*—They were found to vary from a minimum of 5·54 parts on 13th December to a maximum of 29·5 parts per 100,000 on 14th June. They were very high during the south-west monsoon season and very low during the north-east monsoon season; and they increased gradually from February to June when the maximum for the year was reached and decreased thereafter till the minimum was reached in December. The high content of chlorides in the south-west monsoon season was due to low level and the resulting concentration of the pond water and the low content in the north-east monsoon season to dilution due to increased level on account of rainfall.

10. *Organic matter (Tidy's 4 hours test) and its decomposition products.*—(a) Organic matter was found to vary from a minimum of 0·167 part in December to a maximum of 0·70 part per 100,000 on 22nd August. It was least during the north-east monsoon season and highest during the south-west monsoon season. This was also found to increase gradually from February till the maximum was reached on 22nd August and to decrease thereafter till the minimum was reached on 13th December.

(b) *Ammoniacal nitrogen.*—This was found to vary from a minimum of trace on 22nd March to a maximum of 0·006 part per 100,000 on 23rd November. It was found to be very low (trace to 0·003 part per 100,000) in the cold weather, hot weather and south-west monsoon periods and comparatively high in the north-east monsoon season.

(c) *Albuminoid nitrogen.*—This was found to vary from a minimum of 0·022 part on 22nd February to a maximum of 0·176 part on 25th October. It was found to increase from February till


Phosphates
Oxygen
Absorbed
Albuminoid Nitrogen
Ammoniacal Nitrogen
Silicates
Chlorides
Total Solids
Total Hardness
PH
Carbonates
% Sat
Bicarbonates
HC O3
% Sat
CO2
T°C
D.O
T°C
D.O
D.O
T°C
Sun
Shine
T°F
T°F
Rainfall
22 FEB 1934
8 22 MAR
11 27 APR
26 MAY
21 JUN
14 JUL
8 22 AUG
6 19 SEP
25 OCT
23 NOV
13 DEC
30 JAN 1935

June, when the first maximum was reached; and thereafter to decrease in July and to increase again and to remain almost the same in August and September and to reach the second maximum again in October and finally to decrease.

(d) *Nitrous and Nitric nitrogen.*—They were absent throughout the year. In this pond, aquatic vegetation has been stated already to be abundant. By its death and decay, it adds organic matter to the water. The greater the organic matter in solution, the greater will be the decomposition by bacterial action, so that the greater will also be the products of its decomposition. This relationship appears to hold good only from February to September, i.e., the period during which the conditions for existence in the pond are not altered considerably by external factors such as heavy rainfall. A study of the data and graphs for oxygen absorbed and albuminoid nitrogen shows this point clearly.

Therefore, one should expect during this period, an increasingly large amount of ammoniacal and albuminoid nitrogen, nitrites and nitrates, these being the final products of decomposition of organic matter. But no such progressive increase in all the factors excepting albuminoid nitrogen has been noticed. The cause for the absence of nitrites and nitrates has to be explained. It is well known that they constitute the most important nutrient substances for productivity in any piece of water. It is, therefore, quite probable that they are consumed by the abundantly growing aquatic vegetation in the pond as soon as they are formed (Atkins 1932-33). Ammoniacal nitrogen also is not found in great quantities and it can also be utilised by phyto-plankton (Cooper 1933). So it appears that it has been used up by the plants leaving behind only a very small quantity in the water. But the question may arise whether the plants consume directly the ammoniacal nitrogen being "the earlier product of nitrogenous breakdown", or only after its final conversion into nitrites and nitrates or in all states. A partial answer to this query has been furnished by the recent experiment of Harvey (1940) who found that (a) communities of diatoms could use all the ammonia directly and (b) that they utilized all the ammonium before any material quantity of the nitrate was used, although the latter was 60 times more concentrated at the beginning of the experiment and many times more towards the end. It appeared to him that they used up ammonium in preference to nitrate although the latter might be many times more concentrated than the former. It is quite probable that the higher plants in the pond under investigation, used up the ammoniacal nitrogen rapidly as soon as it was formed (Russel 1923), so that there was either no time or not suffi-

cient free ammonia left, for its conversion into nitrites and nitrates. That was probably the reason why neither nitrites nor nitrates have been found at any time in the pond water. Even if they had been formed their absence later can still be explained as being most probably due to the action of denitrifying bacteria, which are stated to be very active at higher temperatures such as those recorded for the pond water (Pia 1934). Which of these processes is taking place in the pond remains a problem which has to be worked out generally for all tropical waters.

Again, a careful examination of the data for organic matter, albuminoid nitrogen and the percentage saturation of dissolved oxygen will show the intimate relationship that exists among them. When the figures for organic matter and albuminoid nitrogen are low, as in the hot weather period, the figure for percentage saturation of dissolved oxygen is fairly high and when the first two factors are high as in the south-west monsoon season, the third factor is comparatively low. These facts would, therefore, show, again, that during the hot weather period, the formation of organic matter was greater than its decomposition, while in the south-west monsoon season, the reverse was most probably taking place.

Summary.

1. The seasonal variations in the physical and chemical conditions of the surface water, for a year, in a eutrophic type of pond resembling the littoral zone of temperate lakes and swamps of the tropics, are recorded.

2. The year during which the investigation was made, may be roughly divided into two periods: the first period, from February to July '34, and the second from August '34 to January 1935; and the former may be considered as the period of the dominance of production over consumption of oxygen and the latter as one of dominance of consumption over production of oxygen.

3. Again in the first period, the temperature of water, dissolved oxygen, carbonates, pH and silicates were high, while the bicarbonate total solids, total hardness, phosphates, ammoniacal nitrogen, albuminoid nitrogen and organic matter were low; and in the second period, the temperature of water, dissolved oxygen, carbonates, pH and silicates were low, while bicarbonates, total solids, total hardness, phosphates, ammoniacal nitrogen, albuminoid nitrogen and organic matter were generally high.

4. The presence of an abundant growth of plants must withdraw most of the nutrient salts of biological significance from the

water. But yet most of them are present, at all seasons, in fairly large amounts which can enable the growth and multiplication of phytoplankton communities. The absence of any phytoplankton and rarity of any zoo-plankton is therefore inexplicable. Further work also is necessary to explain the presence in small quantities of ammoniacal nitrogen, and the absence of nitrites and nitrates in a pond of this type, in the tropics, where the possibilities of their formation and utilisation are great.

The author wishes, in conclusion to thank Rao Bahadur Dr. C. S. Govinda Pillay and Dr. P. Sadasivan for their interest in the work and Dr. M. O. P. Iyengar for help in the identification of the plants.

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TABLE I SHOWING THE METEOROLOGICAL DATA FOR THE CITY OF MADRAS DURING 1934.

(*Daily averages.*)

Months.	Average Temperature (F)	Hours of Bright sunshine	Percentage of cloudy day	Total rainfall (in inches)	Wind velocity (in mil. per day)
February 1934	75·6	10·8	2·8	nil	152
March	79·7	9·7	4·0	nil	165
April	83·8	9·8	5·0	0·74	192
May	87·5	10·8	4·4	nil	205
June	86·7	6·2	8·2	1·76	167
July	85·3	5·6	8·3	2·07	165
August	83·4	6·0	7·8	7·17	148
September	84·2	8·0	6·6	2·00	168
October	81·0	6·4	7·1	16·82	169
November	77·6	7·7	6·2	1·86	219
December	74·9	7·9	5·9	2·19	235
January 1935	75·3	7·6	5·5	0·57	211

TABLE II-A, Y. W. C. A. TANK, VEPERY, MADRAS.

Date	Time of collection	Temp. 0°c	D. O. cc/1	% Sat.	Parts per 100,000			pH	Transparency in cms.	Colour of water	* Meteorological Conditions.
					Free CO_2	CO_3	HCO_3				
22- 2-34	9-15 A.M.	29·6	6·62	118·1	Nil	3·30	0·92	9·3	Not found	Brownish	B.S.S. C.B.S. N.W.
8- 3-34	9-0 „	30·0	5·24	94·0	„	2·10	4·27	9·1	—	do.	do.
22- 3-34	9-40 „	30·5	4·90	88·7	„	2·10	5·80	9·1	—	do.	do.
11- 4-34	9-10 „	30·4	3·59	64·9	„	3·30	5·03	9·3	—	do.	do.
27- 4-34	9-15 „	32·4	8·41	—	„	4·80	2·75	9·3	—	do.	do.
26- 5-34	9-0 „	31·5	3·69	—	„	4·20	8·85	9·3	—	do.	do.
21- 6-34	9-0 „	30·6	10·03	181·9	„	4·65	12·20	9·1	—	do.	do.
14- 7-34	9-30 „	30·5	8·28	149·8	„	3·60	12·51	9·1	—	do.	do.
8- 8-34	10-50 „	29·6	2·70	48·2	„	0·75	6·10	8·5	—	do.	C.S. N.B.S.S. N.W. good rain two days before.
22- 8-34	9-30 „	29·1	2·30	40·7	0·33	—	17·54	8·4	—	do.	do.
6- 9-34	10-30 „	29·6	3·24	58·1	Nil	0·30	8·54	8·2	—	do.	do.
19- 9-34	9-30 „	32·0	4·37	—	„	0·90	4·57	8·5	—	Clayey	B.S.S. C.B.S. S.W.
25-10-34	9-30 „	30·9	4·09	74·5	„	0·30	8·08	8·3	—	do.	C.S. N.B.S.S. sampled just after rains.
23-11-34	9-15 „	27·2	6·68	153·7	„	0·75	5·95	8·8	—	Brownish	C.S. N.B.S.S. N.W.
13-12-34	9-30 „	25·8	4·05	68·0	„	0·45	7·65	8·3	—	do.	C.S. N.B.S.S. Good fall on the previous day.
30- 1-35	9-30 „	27·2	4·93	84·7	„	0·75	8·84	8·2	—	do.	B.S.S. No wind.

*B.S.S.—Bright Sunshine; C.B.S.—Clear blue sky; C.S.—Cloudy Sky; N.B.S.S.—Not bright sunshine; N.W.—No wind; S.W.—Slight wind.

TABLE II-B, Y. W. C. A. POND, VEPERY, MADRAS.

Date	Parts per 100,000									
	Total Hardness	Chlorides	Am. N.	Alb. N.	Nitrous N	Nitric N	Oxygen absorbed	Total solids	Phosphates (P_2O_5)	Silicates
22— 2—34	12·0	7·55	0·003	0·022	Nil	Nil	0·215	30·6	0·001	0·88
8— 3—34	12·0	8·45	0·003	0·040	„	„	0·283	31·9	0·001	0·88
22— 3—34	12·0	10·50	0·002	0·031	„	„	0·292	33·2	0·001	0·90
11— 4—34	12·0	10·50	trace	0·036	„	„	0·320	36·0	0·001	0·64
27— 4—34	12·0	11·00	0·002	0·054	„	„	0·344	37·9	0·001	0·64
26— 5—34	12·0	16·50	trace	0·073	„	„	0·518	45·8	0·002	0·64
21— 6—34	14·0	24·50	0·003	0.128	„	„	0·704	67·8	trace	0·50
14— 7—34	18·0	29·50	0·003	0·064	„	„	0·592	78·0	nil	0·56
8— 8—34	26·0	28·40	0·002	0·080	„	„	0·400	78·8	0·002	0·56
22— 8—34	32·0	24·42	0·002	0·088	„	„	0·708	117·6	0·004	0·56
6— 9—34	24·0	20·60	0·002	0·080	„	„	0·500	80·0	0·002	0·26
19— 9—34	22·0	18·40	0·003	0·080	„	„	0·338	72·6	0·004	0·50
25—10—34	22·0	12·07	trace	0·176	„	„	0·310	61·6	0·003	0·50
23—11—34	14·0	5·25	0·006	0·104	„	„	0·186	46·2	0·005	0·50
13—12—34	14·0	5·54	0·005	0·104	„	„	0·167	32·8	0·006	0·20
30— 1—35	16·0	10·83	trace	0·060	„	„	0·214	47·2	0·002	0·16

STUDIES IN INDIAN PAINTING

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I

ANCIENT WALL PAINTING IN THE CAVE TEMPLES AT MĀMANḌŪR

In 1923 Prof. Jouveau Dubreuil reported the discovery of traces of colour in the cave temples at Māmaṇḍūr,[1] which is situated 6 miles from Conjeevaram (12°51′ N & 79° 43′ E), the ancient Pallava capital. We owe these cave temples to the Pallava king, Mahendravarman I (590—620 A.D.) as is proved by an inscription.[2] It is probable that the paintings also belong to the same period. It may be pointed out that the architectural style and the richness of the colour are identical with those at Śittaṇṇavāśal.[3]

Though the caves were once fully decorated with paintings there are only traces of paint now.

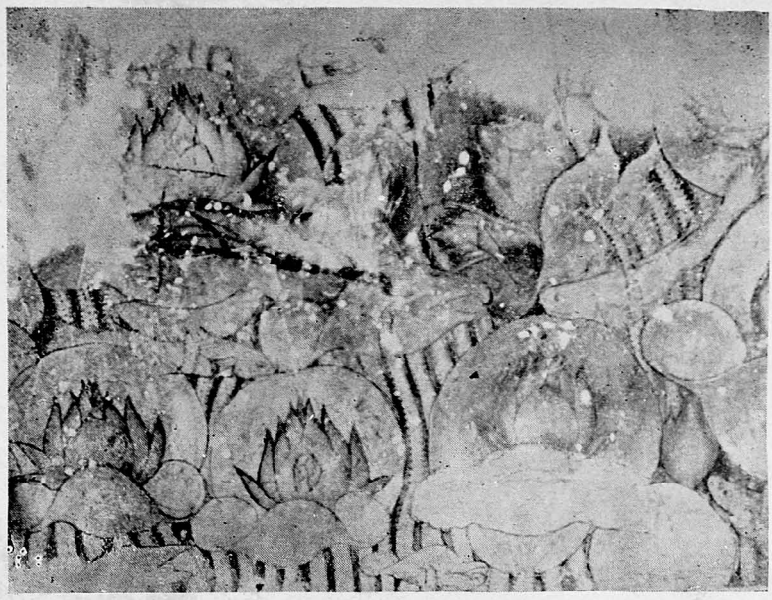
Experimental.

The subjects of these investigations were the carrier, the ground, the pigments and the binding medium.

Carrier.

From the traces of paint that are to be seen even to-day, it is evident that the ceilings, the inner walls and the pillars of the cave temples served as the mechanical foundations for the paintings. Their rough surface held the plaster fast.

1. Jouveau Dubreuil, Pallava Painting, Indian Antiquary LII (1923), p. 45.
C. Minakshi, Administration and Social Life under the Pallavas (Madras University Historical Series, 1938), p. 289.
2. T. N. Ramachandran, The Royal Artist, Mahendravarman I, Reprinted from Journ. Ori. Res., p. 11.
3. Jouveau Dubreuil, *Loc. Cit.*



Some of the well preserved portions of the paintings

Damage to paintings through sharp instruments

Ground.

Microsections of the painted stuccoes showed two lines of cleavage separating three layers, namely, the rough plaster, the fine plaster and the paint film. The layers of fine plaster and the paint film could be separated from each other by a sharp pin. But no such separation could be effected between the fine plaster and the rough plaster. Thus the binding between the fine plaster and the rough plaster is strong.

The rough plaster varies in thickness from 5·7 m.m. to 11·8 m.m. depending upon the inequality of the surface on which it has been applied. The thicknesses of the fine plaster and the paint film are 0·5 m.m. and 0·3 m.m. respectively.

On mechanically separating the particles composing the rough plaster and grading them according to size,[4] it was found that nearly a fourth of them was less than 200μ and another fourth was greater than 700μ. The remaining particles ranged in size between 200μ and 700μ.

The results of chemical analysis of the rough plaster are as follows:—

	Chemical Analysis (Per cent)
Moisture ..	0·61
Carbon dioxide, CO_2 ..	7·95
Combined water and Organic matter ..	8·56
Silica, SiO_2 ..	53·21
Iron and Alumina, $Fe_2O_3+Al_2O_3$ ..	4·51
Lime, CaO ..	19·69
Sulphuric Anhydride, SO_3 ..	0·19
Magnesia, MgO. ..	0·92
Undetermined (mostly alkalies) ..	1·56

The rough plaster is composed of lime and sand. There is no other inert material[5] except sand, which has been specially added to serve as such. A pure rich lime having no hydraulic properties has been used and this shows that proper care has been taken in the preparation of lime for painting work. No organic binding

4. G. W. Robinson, Soils: Their Origin, Constitution and Classification (Murby), 1932, pp. 12-13.

5. Proc. Ind. Acad. Sci., A, 1938, 7, pp. 286-87.

material like gum or glue has been added and the consolidation of the rough plaster has been brought about by lime.

The fine plaster consists merely of a lime wash.[6] From the strong binding between the rough plaster and the fine plaster, it is clear that the latter was applied while the former was still wet.

Pigments.

The following pigments have been identified[7]:—

Lime
Yellow ochre
Red ochre.
Terre verte.

Binding Medium.

There was no water soluble binding medium nor drying oil, glue, albumin, or casein in the paint.[8] The technique was one of lime medium.[9]

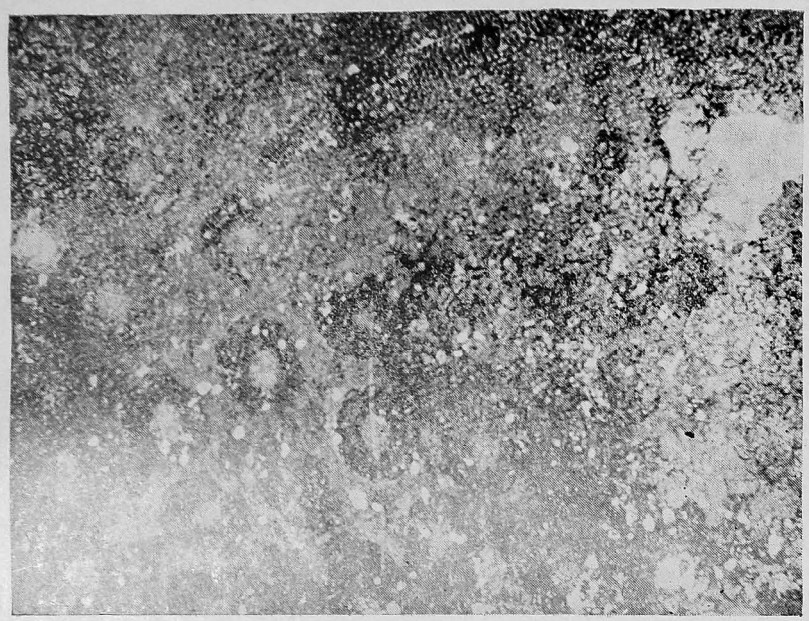
II

ANCIENT WALL PAINTINGS IN THE JAIN TEMPLE AT TIRUPARUTTIKUṆṚAM.

Tiruparuttikuṉṟam is situated about 2 miles from Conjeevaram on the right bank of the river Vegavatī. It formed part of Conjeevaram from very ancient times. The temple is of interest both architecturally and on account of the paintings.[1]

The ceilings of the front hall of the Vardhamāna temple at Tiruparuttikuṉṟam bear a series of coloured paintings which illustrate the life story of some of the Jain saints. The temple was built in the 14th century A.D. and the paintings probably belong to the late 14th century A.D. or the early 15th.[2] The paintings belong to

6. Proc. Ind. Acad. Sci., A, 1939, 10, p. 80.
7. Martin de Wild, The Scientific Examination of Pictures (London, G. Bell & Sons, Ltd.), 1929.
   Technical Studies, 1935-36, 5, pp. 230-31.
8. Technical Studies, 1935-36, 4, pp. 135-44.
9. Proc. Ind. Acad. Sci., A, 1939, 10, p. 83.
1. T. N. Ramachandran, Tiruparuttikuṉṟam and its Temple (Madras Government Museum Bulletin), 1934, pp. 63-164.
2. T. N. Ramachandran, *Loc. Cit.*, p. 29.



* Represents the layers of insect wax on the paintings

Damage to paintings through the pealing off of the painted layer

a type of folk art which was so common during the Vijayanagar times.

The chemical investigations on the paintings were limited to the carrier, the ground, the pigments and the binding medium.

Carrier

The paintings are to be found only on the ceilings which serve as the mechanical foundations for them. The ceilings are constructed of large slabs of hornblende-gneiss joined together by plaster. Their rough surface has held the plaster fast. Not a little of the damage to the paintings has been caused by the rain water percolating through the interstices between the slabs of stone, and soaking into the plaster ground.

Ground

Microsections of the painted stuccoes showed two lines of cleavage separating three layers, namely the rough plaster, the fine plaster and the paint film. The three layers can be separated from one another by means of a pin. Thus there is no proper binding between the adjacent layers.

The rough plaster varies in thickness from 2 m.m. to 5·2 m.m. depending upon the nature of the surface on which it has been applied. The fine plaster and the paint film are each 0·3 m.m. thick.

The particles composing the rough plaster were mechanically separated and graded according to size. It was found that half of them was less than 200μ and the remaining half varied in size from 200μ to 700μ.

The results of chemical analysis of the rough plaster are as follows:—

	Chemical Analysis (Per cent)
Moisture ..	0·84
Carbon dioxide, CO_2 ..	7·09
Combined water and Organic matter ..	3·38
Silica, SiO_2 ..	71·47
Iron and Alumina, $Fe_2O_3+Al_2O_3$ ..	0·83
Lime, CaO. ..	14·53
Sulphuric Anhydride, SO_3 ..	0·11
Magnesia, MgO ..	0·26
Undetermined (mostly alkalies) ..	1·49

The rough plaster is composed of lime and sand, the latter predominating. There is no other inert material except sand. A pure rich lime without any hydraulic property has been used. This indicates that proper care has been taken in its preparation.[3] No organic binding material like gum or glue has been added[4] and the consolidation of the rough plaster has been brought about by lime.

The fine plaster is only a lime wash.[4] From the lack of binding between the rough plaster and the fine plaster, it seems that the latter was applied after the former had set.

Pigments.

The following pigments were identified[5]:—

Lime
Yellow ochre
Red ochre
Carbon
Indigo.

Binding Medium.

The paints had no water soluble binding medium, nor was there any drying oil, glue, albumin or a casein.[6] The technique was one of lime medium.[7] In the case of the black, however, gum has been added. From the lack of firm binding between the fine plaster and the paint film it is clear that the paint was not mixed with sufficient quantity of lime medium.[8]

III

PRESERVATION OF ŚITTAṆṆAVĀŚAL FRESCOES.

During the last few years, the problem of conserving ancient wall paintings has received some attention in India. Through the efforts of Sir John Marshall, formerly Director General of Archaeo-

3. May Doerner, The Materials of the Artist and their Use in Painting (New York, Harcourt, Brace & Co.), 1934, p. 269.
4. Technical Studies, 1935-36, 4, pp. 135-44.
5. Proc. Ind. Acad. Sc., 1939, X, p. 80.
6. Martin De Wild, The Scientific Examination of Pictures, (London, G. Bell & Sons, Ltd.), 1929.
   Technical Studies, 1936-37, 4, pp. 224-28.
7. Technical Studies, 1936-37, 4, pp. 135-44.
8. Proc. Ind. Acad. Sci., 1939, X, p. 83.

logy in India, the H. E. H. Nizam's Government secured the services of two Italian experts, Signor L. Cecconi and Count Orsini, for cleaning and preserving the famous wall paintings at Ajanta[1] and Ellora.[2] But no such work seems to have been done far other ancient paintings in India. Recently, however, on the recommendation of the Government of India and the Director General of Archaeology in India, the author was invited by the Pudukkottai Darbar to preserve the wall paintings at Śittaṇṇavāśal, which form the only group of Jain paintings in India of the 7th century A.D. executed on the Ajanta style.

It is needless to point out that the cleaning and preservation of ancient wall paintings without altering their original character, is a very delicate work and depends upon a detailed chemical study of the artist's methods and materials. For example, the method of cleaning and preserving a tempera painting differs from that adopted for fresco work. Careful use of water is permitted for cleaning some of the frescoes. But the use of water will completely destroy a tempera work. Further, if a wax preservative coating is applied to a fresco, it will give the appearance of tempera work. Where the two processes or variations of them are adopted in a group of paintings at the same site or even in different places in the same panel—which is not unusual—the problem of cleaning and preserving paintings becomes complex.

Thus the work of conserving ancient wall paintings is conditioned by exact knowledge regarding the chemical technique of the process adopted by the artist, the nature of the surface and the causes of deterioration through ages. Any attempt at conservation without such knowledge will result in considerable damage to the paintings.

So far as the author is aware, there is no publication giving details of the investigation on this subject with particular reference to known paintings. An attempt is made here to fill this gap so that it might serve as a guide for future work at other important sites. It might be pointed out here that the work of cleaning and preserving Śittaṇṇavāśal paintings has been preceded by an investigation on the artist's methods and materials.[3]

1. Annual Report of the Hyderabad Archaeological Survey, 1920-21 and 21-24.

2. Annual Report of the Hyderabad Archaeological Survey, 1932-33.

3. S. Paramasivam, The Mural Paintings in the Cave Temple at Sittannavasal—An Investigation into the Method, Technical Studies, 1939, VIII, pp. 82-89.

(2) *Problems of Conservation.*

The main problems in cleaning and preserving these paintings are as follows:—

(a) Removal of all the causes which have led to the deterioration of the paintings.

(b) Cleaning of the paintings.

(c) Fixing the plaster and the painted layer.

(d) Application of a suitable preservative coating.

The problems have been set down in the above order for purposes of convenience. It does not necessarily follow that this is the order in which the work was actually handled. For example, in certain cases, it was found necessary to clean the paintings prior to fixing. In other cases, this process had be reversed even in different portions of one and the same panel. Thus the order to be followed depends on the condition of the paintings or portions thereof.

(3) *Causes of Deterioration.*

The causes that are responsible for the deterioration of these paintings are partly external and partly internal. In other words, the damages to paintings have been brought about by external or outside agencies and secondly by the defective methods of workmanship adopted by the artists.

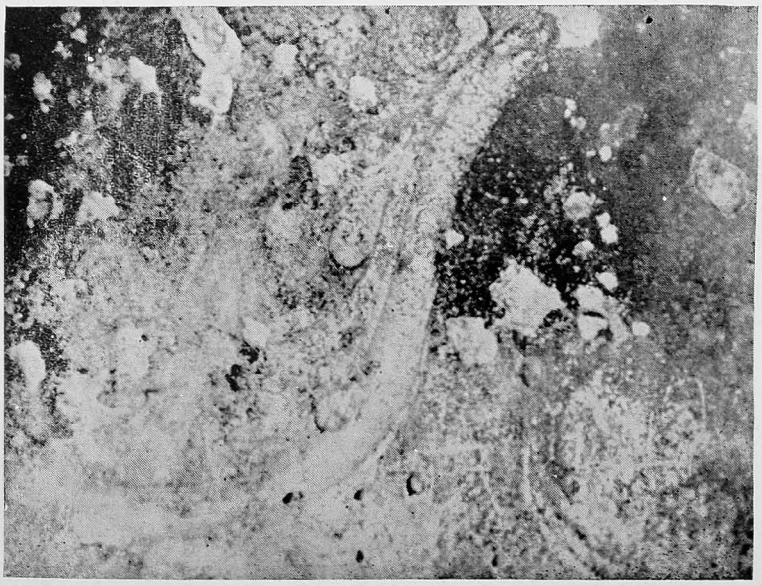
External Causes.

The external causes for the deterioration of the paintings partly depend on the particular construction and situation of the cave temple housing the paintings and partly on causes extraneous to them.

The principal cause for the deterioration of many wall paintings is poor or insufficient ventilation as at Ajanta, Ellore and the Bṛhadīśvara temple at Tanjore or excess of them as at Śittaṇṇavāśal. The outer verandah at Śittaṇṇavāśal which contains all the valuable paintings is exposed to the sun, rain and winds laden with moisture or dust.

There was a thick layer of algal growth cemented to the surface and completely covering all the details of artistic workmanship. This was due to the effect of moisture and sunlight on the paintings. In many places the pigment and the plaster layers have fallen off. In summer and during the hottest part of the day, the warm, dry air comes in contact with the paintings and withdraws from them

Damage to paintings through peeling off of the painted layer



Right hand portion represents black algal growth on the paintings
Left hand portion represents details of the paintings rendered visible by the removal of algal growth

some of the hygroscopic moisture necessary for the paintings and this causes capricious changes in the size of the particles composing the plaster. This is partly responsible for the peeling of the layer of pigment and the plaster.

A more serious source of trouble is a damp wall. Many of the paintings are exposed to rain. With a damp wall, the moisture escapes through the paintings and thereby causes damage to the paintings, as at Śittaṇṇavāśal.

Since the paintings are exposed to the winds, the latter have invariably carried dust and deposited it on the paintings.

The causes of decay external to the construction and situation of the cave temple are partly due to human agencies and partly to agencies other than human. The inner shrine at Śittaṇṇavāśal with its ceilings covered with paintings, is dark and dingy, but the verandah which contains most of the paintings is very well lighted. The dingy atmosphere of the inner shrine breeds insects, cockroaches, bats etc. They have left their remains on the paintings. Further there are unmistakable evidences of wasp nests and insect cocoons. Some of the insects have left their wax on the surface of the paintings. Thus the main problem, so far as the insects are concerned, is to eliminate them from the cavities and the hollow behind the plaster. The enlargement of the mouths of the holes or cavities on the walls and ceilings due to the insects going in and coming out, the enlargement of the cavities themselves and the consequent weakening of the painted plaster, the presence of wasp nests and insect cocoons over the paintings are some of the causes responsible for the damage done to the paintings.

By far the most serious damage to the paintings has been caused by human agencies, thus:—

(a) Scratching and scribbling with sharp instruments.

(b) Inscribing of the census number by census authorities on the paintings.

(c) Use of smoky fires in the caves by the wayfarers.

(d) Inscribing of charcoal marks and figures.

(e) Inscribing with lime marks.

(f) Smearing the surface with oil.

(g) Use of tracing paper, gum and glue by artists in tracing the paintings, which have been left sticking to the surface.

The use of smoky fires in the past has given rise to a deposit of oil and soot on the paintings, the former attracting dust and dirt,

which have covered all the details of the paintings and darkened them.

Internal or Technical causes for deterioration.

The technical defects in the artistic workmanship have resulted in the scaling of the pigment layer and the layer of plaster. Where it has peeled off in tiny spots, the impression is one of general fading of the pigment. In some places there is no good binding between the stone wall of the cave and the rough plaster with the result that the latter tends easily to fall off. In spite of this, the stucco is held in position by the stronger binding in other places. In a few places, the fine plaster has separated from the rough plaster and the layer of pigment has separated from the fine plaster. This indicates defective workmanship in that the fine plaster was applied over the rough plaster after the latter had dried and that the pigment was applied with insufficient or with carbonated lime medium.

The tendency to scale off is more pronounced on the ceilings of the inner shrine. There is an outer layer of painting over the inner layer. The binding between the two stuccoes is weak so that a gentle tapping brings down the upper layer of paintings. This indicates that the second layer of rough plaster was applied after the earlier smooth painted layer had dried.

Another defect is the smoothness of the fine plaster, probably through polishing. Such smooth surface has a disadvantage. The pigment layer holds faster to a rough surface rather than to a smooth one.

(4) *Cleaning of the paintings.*

It has been explained elsewhere that the technique adopted at Śittaṇṇavāśal is one of fresco-secco. In this respect, the technique is entirely different from the one adopted at Ajanta, which has been conserved for us by the Italian experts. The Śittaṇṇavāśal plaster is firmer and better consoliated than the Ajanta one. These facts give us some clues as to the mode of approach to the problem of conserving the paintings.

The causes for the damage to the paintings which can be easily removed are as follows:—

(i) wasp nests, (ii) insect cocoons, (iii) insect wax, (iv) dirt and dust, (v) organic deposits including oil which always attract dirt and dust, (vi) soot (vii) charcoal marks, (viii) tar marks, (ix) lime marks, (x) tracing paper, gum and glue, (xi) algal growth,

(xii) tendency of the pigment layer and the layer of stucco to fall off.

Wasp nests.

When in thick layers they were partly detached by tapping them with the finger or a piece of wood or even a blunt needle. Where the painted surface was firm, soft fibre brushes were used, while care was taken not to drive the mud into the crevices between the plaster and the painted layer.

In cases where the mud persisted, it was carefully washed with a mixture of petrol and benzene (in equal volumes) or with 90% alcohol applied with a brush. In cases where it still held fast, damp sponge (not wringing wet) was tried. This was done slowly and cautiously using minimum of water and frequently rinsing the sponge and changing the water. In the absence of these precautions, there might be some staining of the surface. Where it still persisted, soap solution was used.

The petrol mixture was effective where there was the presence of organic matter.

Insect cocoons.

These were generaly removed in a dry condition with the fingers or with the help of a needle. In certain cases, it was necessary to soften them with water before removing. At times, soap solution was more effective. Wherever the cocoons struck fast to the surface due to the presence of organic matter, a mixture of petrol and benzene was more effective. These liquids were applied with a cotton swab.

Wax.

This was removed by gently scraping it with a hot blade. Where it persisted, a mixture of toluene and xylene followed by an independent treatment of turpentine or xylene was helpful. The wax was removed with a cotton swab which was dipped in one of the liquids and rubbed lightly over the surface till it brought away in solution a little of the wax each time.

Dirt, dust and soot.

For removing the dust, a pair of bellows was first tried followed by the application of water with a soft brush. Wherever these methods were ineffective, a mixture of petrol and benzene or 90% alcohol was used.

Heavy insoluble accumulations of dirt were removed with a mixture of a thin solution of soap and ethyl acetate in equal volumes and diluted with twice their volume of water. The solution was applied to the surface by means of a cotton swab or a soft brush and then washed with water after an interval of about half an hour. In obstinate cases, the surface was covered with this mixture several times and the surface cleaned with hot water.

Organic deposits.

Deposits and stains of an organic nature (grease, oil, resin etc., which always attract dust and dirt) were removed, with petrol-benzene mixture applied with a cotton swab, care being taken not to drive the liquid into the pores behind the paint film or the plaster. Chloroform, acetone and ether were separately used in obstinate cases.

In some places, a black sticky deposit of animal excreta was present which did not respond to the petrol-benzene mixture. A dilute solution of ammonium hydroxide (1:4 and then 1:3) used was very effective.

Charcoal marks.

A 5% solution of sodium carbonate in water, ethyl acetate-soap solution mixture and ammonium hydroxide were effective.

Tar marks.

Acetone and ether were effective.

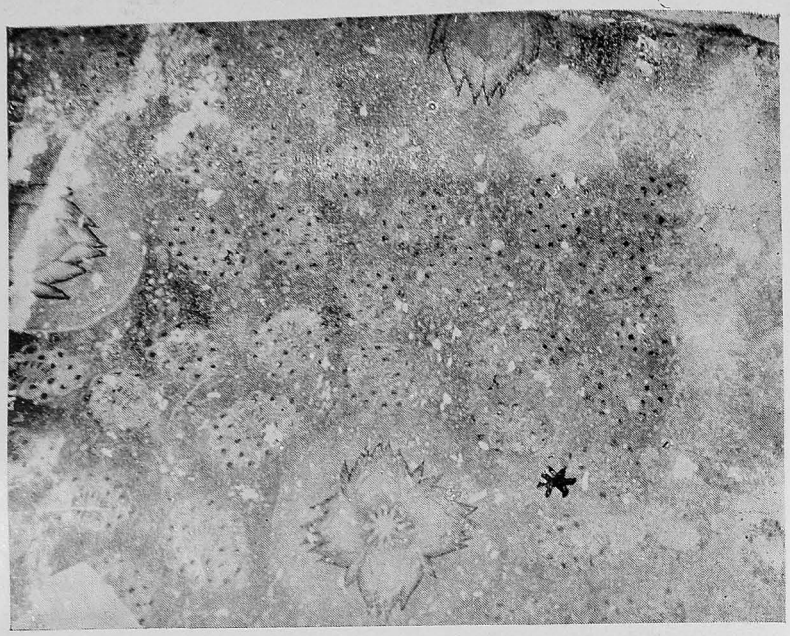
Lime marks.

Wet lime has been used for making these marks. Through carbonation the lime has become cemented to the surface. The painted surface was well washed with water and a cotton swab dipped in dilute acetic acid (1:4) was rubbed over it and then the surface was washed with water, when it was found that the lime marks had disappeared.

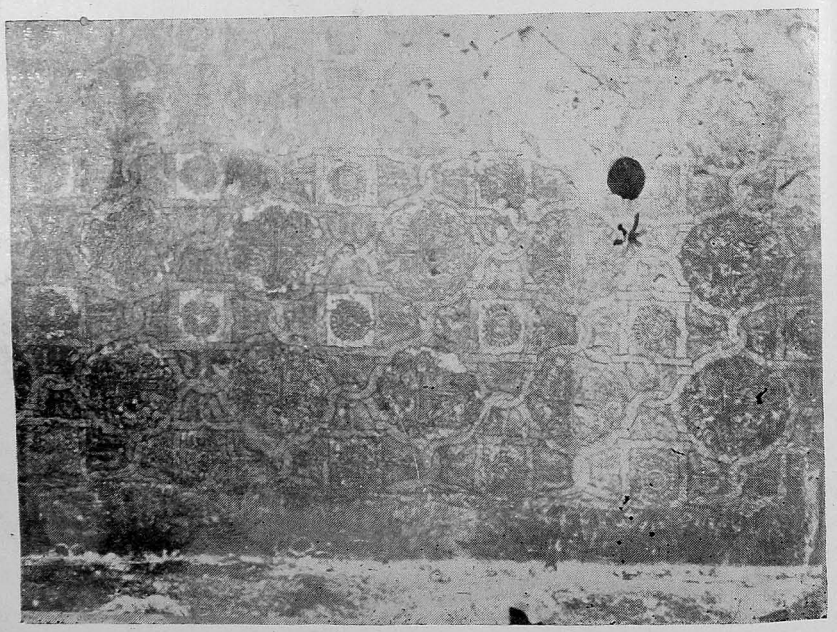
Tracing paper, gum and glue.

These were removed by repeatedly wetting the areas with hot water.

* Recently the front hall of the cave temple at Tirumayam was covered so thickly with oil, soot, dust and dirt that there was no sign of any paintings. They were, however, removed with soap and solution-ethyl acetate mixture and the paintings were uncovered.



Treated and untreated portions of the paintings
* Represents untreated portion



Treated and untreated portions of the paintings
* Represents untreated portion

Algal growth.

For the removal of the algal growth, the following special preparations were made:—

(a) Powdered pumice stone (Very fine and soft without gritty particles)	1 part	by weight
Chalk	2 „	„
Dried sodium carbonate	1 „	„

These were made into a paste with equal volumes of water and glycerine and rubbed over the surface with a piece of wet cotton.

(ii) Soap	4 parts	by weight
Chalk	4 „	„
Sodium bicarbonate	1 „	„
Calcium Sulphate	2 „	„
Water	50 „	„

The mixture was boiled for 15 minutes, rubbed over the painted surface and left for about half an hour. The surface was then brushed with a soft brush, cleaned with hot water and the process repeated till the surface brightened. Of these two recipes, the first was more effective.*

*In a private communication to the author, Mr. Rutherford J. Gettens of the Fogg Art Museum of the Harvard University to whom a sample of the plaster was sent writes as follows:—

"I agree with you that the black substance covering the painted layer is organic in origin. I observed under the microscope that there are a lot of mold mycelia, and it is probable that the whole discolouration is caused by mold or by mildew or by algae as you say. In our experience we have found that the mold and the mildew are the most difficult things to remove from any kind of surface; you cannot bleach it, and it is difficult to remove it mechanically. I think you have adopted the right method. A mechanical method with the help of some alkaline substance is probably the best ..... Some years ago they had trouble with the formation of mildew on paintings in the Administration Building at the Panama Canal Zone. The surface was cleaned with a mixture of alcohol and ammonia. Although this did not prevent the mildew from recurring in a few years, the method is said to have cleaned the surface very well at the time. I used this mixture on one of your samples and it did remove some of the black but not all of it. You have, as I said, a difficult problem and one to which no one, as yet, found an adequate solution.

(5) *Fixing the plaster and the paint film.*

It was the usual practice in the past to employ some sort of cement for fixing the plaster and the paint film. But all cements take a very long time to dry. In the process of drying they expand in the direction of least resistance and carry with them harmful elements in their composition. In the case of the paintings, the direction of least resistance is naturally the direction towards the paintings. In the absence of proper care and control of the process of setting, the painted layer invariably disintegrated.

Some of the special cements that have been used are the following:—

(i) Lime-casein. This is a good cement except that casein is a palatable and nourishing food for insects. It cannot be used without the admixture of some poison like arsenic to keep out the insects. But the proportion of lime and casein and their consistency have to be carefully worked out, which is not easy.

(ii) Paraffin wax. This might be usefully employed in a cooler climate. At Śittaṇṇavāśal the temperature in the shade goes up to about 110°F in summer and some of the panels are directly exposed to sunlight, and hence its use was out of question.

(iii) In recent years vinyl acetate[4] dissolved in some suitable organic solvent has come very much into use as a fixative. It has been used in fixing the painted layers of Chinese paintings in the Royal Ontario Museum of Archaeology in Toronto. It is the most perfect fixative so far known and can be used with any type of painting. When it is applied to painted surface, it polymeises and forms a transparent film which protects the surface from dust and soot.

For fixing the plaster, the vinyl acetate solution of suitable consistency was injected behind the plaster by means of a hypodermic syringe. For fixing the loose painted film, the solution was applied to the surface with a soft brush.

The solutions generally used are 5%, 10%, and 20% solution of vinyl acetate in the following solvants,

4. T. P. Gladstone Shaw, The Properties of some polyvinyl resins as lacquer resins—Official digest of the Federation of Paint and Varnish Production Clubs.—Canada, January, 1937.

(i)	Toluene	70%
	Xylol	20%
	Pine oil	10%
(ii)	Benzol	60%
	Toluene	15%
	Xylene	15%
	Pine oil	5%
	V. M. P. Naphtha	5%
(iii)	90% alcohol.	

For use with hypodermic syringe, a 5% solution was used. For brushing, 10% and 20% solutions were the best.

(6) *Toning.*

The paintings appeared faded through ageing and the application of vinyl acetate imparted a proper tone to the paintings.

In conclusion, the author desires to express his thanks to the Pudukkottai Darbar for providing him with all facilities for this work; to Mr. J. F. Blakiston, formerly Director General of Archaeology in India, and to Rao Bahadur K. N. Dikshit, Director General of Archaeology in India for suggesting his deputation for preserving the paintings, to Sir Alexander Tottenham, C.I.E., Administrator of the Pudukkottai State and to Dr. F. H. Gravely, Superintendent of the Madras Government Museum, for their great interest in this work.

DR. SAMUEL BROWN

Physician and Proprietor of Madras in the 17th Century

By

D. V. S. Reddy, M.B.B.S.,

Vizagapatam.

Dr. Samuel Brown was a prominent person in the early days of Fort St. George. He was popular and famous as a physician and surgeon in Madras and its environs. But his friendly dealings with the Moors and his attempts to become a Zamindar were viewed with suspicion by his superiors and employers. His guilt in the accidental poisoning of Mr. Wheeler and his duel with Dr. Blackwell made him still more notorious. But he somehow managed to survive all his scandals and sorrows. He soon regained and enhanced his prestige and practice by his personality, his multifarious activities and his remarkable cures. When he was discharged from the Company's service at Madras, he had an extensive practice. This circumstance, combined with his other interests in Madras prompted him to settle down as a private practitioner in the growing city rejecting the offer of the Company to send him out as a Medical Officer to Bengal. He died in Madras and his tomb stone can still be seen in St. Mary's Church in the Fort.

The surname Brown occurs fairly commonly in the records of the Fort St. George in the 17th Century. Even in the single decade in which Dr. Brown lived in Madras, there were at least 8 persons with this name differentiated, however, by their Christian names. About the year, 1690, there were living in Madras a John Brown, a free-man inhabitant of the place, a William Brown, a soldier, and a Leonard Brown. John Brown seems to have secured a job in the gun-room in 1693, in 1696 and again in 1698. Richard Brown who was at Vizagapatam in 1687 was at Madras for some years and died there sometime before October 1696. George Brown was a soldier and was discharged in 1695 for his drunkenness. Robert Brown the 4th mate of a Ship is mentioned in the records of 1696. More surprising than these names is the fact that there were in Madras at the same time two

persons having the same name, *viz.,* Samuel Brown. According to a letter, dated 25th January 1688, from London to Fort St. George, a certain Samuel Brown was entertained as a writer and sent to Madras. In the records of 1697, one of the free-men inhabitants of the town is mentioned as Samuel Brown. Again in the records of 1698 it is noted that the Assay Master promised to instruct Mr. Samuel Brown and make him qualified for the employment. Lastly, there was the hero of this sketch, Dr. Samuel Brown (Browne).

BROWN'S CAREER AS A MADRAS SURGEON.

Dr. Brown was first appointed as surgeon to the Fort by the Council of Fort St. George. On the death of Dr. Heathfield on 31—3—1688, the Council was compelled to appoint locally a successor to Heathfield, pending a nomination by the home authorities. An entry dated 7—4—1688 reads: "Dr. Heathfield being deceased and Dr. John Plumer gone home upon *Royall James,* and the hospital being in great want of an able Chirurgeon, Dr. Samuel Brown, late Chirurgen of *The Dragon,* being reputed so, and desirous of the employ, it is ordered that he be entertained at the same salary and allowances as his predecessor—Dr. Heathfield had."

From the extracts now available, it would appear that Heathfield had 36 pounds per annum as salary, 5 pagodas per mensem for diet money and 50 fanams per mensem for keeping a horse. He also had allowances given for the maintenance of assistants and servants.

Dr. Samuel Hart who was appointed as another surgeon in the course of the year 1688, continued as a colleague and assistant of Dr. Brown. In due course, the Company sent out Dr. Bulkley who arrived in 1692. Thereupon the Council of Fort St. George passed the following orders on 29—12—1692.

> "Ordered that Dr. Bulkley Chirurgeon do enter upon his charge of hospital and take care of the patients therein and look after all the medicines and other things carefully that none be spoiled or wasted negligently or used for any other end or purpuose but those they were intended for. And that he keep an account of all the material actions in a book that may remain in the Hospital to be examined when needful or required..... "Dr. Brown is to be continued a Chirurgin here as before..... And in refund of the supply of Chirurgeons from England there is not room for the continuance of Dr. Hart. He is to be discharged for employment."

Five years elapsed before the Company discovered that Fort St. George was maintaining two surgeons. They immediately ordered a reduction. Dr. Brown was discharged at the end of 1697. The list showing the names of Company's servants at Fort St. George at the end of September 1697 includes the names of Bulkley and Brown as Surgeons. A consultation dated 3rd January 1698 records that new allowances were permitted to Dr. Bulkley. The same adds "and Dr. Brown is discharged from service and allowances from the last day of November last." This action was probably taken in pursuance of the Company's letter by Ship *'Tavastock.'* A list of employees at Fort St. George in 1688 contains only Bulkley's name as surgeon. The Company, however, held out a ray of hope "As for Brown, if it please God our surgeon of the Fort or Bay or elsewhere should die or be moved, we are willing Mr. Browne should have first preference to such a vacancy." Brown was then offered a job. He declined it, as evident from the following extract dated 13th January 1698.

> "In pursuance of the Rt. Honble: Comps: orders in (the) 56 paragraph of their Generall Letter by (the Tavestocke) Dr. Brown having been Discharged from their service in this Garrison and an (....) made him of being a Chirurgeon of Chuta (nutte) ffactory in Bengall, Hee doth excuse himself from goeing for the present by reason of his engagement in practise here."

By the time another vacancy occurred and was offered in 1705, Brown was long dead. Brown died about the end of 1698, at Madras.

* * * * *

The Trial of Brown in A Case of Poison.

The most unfortunate accident in Dr. Brown's practice is summarized as followed by Col. Lowe (Vol. I, p. 565): —

> "Mr. James Wheeler, one of the members of the Council, took a dose of Brown's Physic on the 30th August 1693, before starting on his morning walk. He did not appear at the Council meeting held in the forenoon and word was brought that he had been seized with serious illness. Another message followed at 11 a.m. reporting his death. The Council at once adjourned and set out for Wheeler's house. On the way, a letter was put into the President's hands. A flash of recollection had revealed to Dr. Brown that the medicines administered in the morning had been inadvertently pounded by a servant in a mortar used for Arsenic. Immeasurably distressed, Dr. Brown huriedly penned a note to the President saying 'I have

murthered Mr. Wheeler by giving him Arsenic. Please to execute justice on me the malefactor as I deserve.' Dr. Bulkley held an autopsy and reported that, though little could be gleaned from appearances, the symptoms before death pointed to poison. Browne and his servants were committed into custody. The former was tried and acquitted by Grand Jury who broght in the bill Ignoramus."

THE EXACT DETAILS AS GIVEN IN THE CONSULTATIONS FROM DAY TO DAY.

WEDNESDAY, 30TH AUGUST 1693

Word being brought us while at Consultation on Ye: 28th: Inst: that M. Wheeler was very sick, and soon after about 11 a clock that he was dead, wee went forthwith to his house and appointed Mr. Mildmay & Mr. Vanden Anker to take accot: of ye: Rt: HonbleP Companyes Books and papers, wch: were in Mr. Wheelers hands, but in ye way thither ye following note was delivered into ye hand of ye President Vizt.

I have Murthered M. Wheeler, by giveing him Arsnick, Please to executed Justice on me the malifactor as I deserve.

SAMUELL BROWNE.

* * * * *

Whereupon Doctor Browne after examination and his perticular relation of the circumstances of a fatall mistake was by warrant of ye Judge of Advocate committed as allso his servant who negligently powdered Pearl in a stone Morter wherein arsnick had been before beaten, the mixture whereof with the Pearle is supposed to be the occasion of his Death, and there being symptoms of Poyson Doctor Buckley (Sick) ye: Chyrurgeon of the Hospital was *ordered to open the Crops and make his report.*

* * * * *

DR. BUCKLEY'S REPORT CONCERNING MR. WHEELER.

May it Please your Honr. with the Worspll: Councill.

According to your orders I did on Munday ye 28th: instant in ye afternoon *open ye dead Body of Mr. James Wheeler* about five hours after his death, and upon veiwing ye: Viscera or Bowells, found them not much altered from their naturall temper and Colour the parts that seemed to suffer most were ye stomack and gutts wch: were a little inflamed and allmost wholy bared and strip't of the mucous or slimy covering wth: which those parts are commonly invested, ye Lungs allsoe were a little inflamed ye:

blood that I gathered of severall vessels all appeared blacker then usuall, But ye suddainness of his death, and the severe symptoms he laboured under before he dyed, were greater arguments of Poyson received then anything I could trace out by Dissection, this from.

Srs

Yor Honrs & cas most humble and obedient Servt,

EDWD BULKLEY.

Fort St. George ye 30th August 1693.

* * * * *

Dr. Brown himself submitted the following account of the incident and asked to be excused.

Honble Sir,

After I came from the Camp Mr. Wheeler did several times desire Physick of me, but because his Lady was much against it, and his Occasions not very great, I as much as I could without displeasing him, declined the gaveing it, but about the Latter end of August he was very Urgent and came to my house for Physick, but I being abroad at that time as soon as I Came home and being told of his being there and gon

(Ten pages in original missing here in Madras record office).

* * * * *

(The ten pages of matter missing in Madras Record Office is as follows (obtained from India Office transcript)

I waited on him to know his pleasure, he told me, he designed to take a Vomitt without his wifes knowledge, but since it happened that she was present, it was all one, for he was opprest with a great heaviness in his stomach, sower belchings, and want of appetite, but he was mostly concern'd because that whatever he eat seemed to have little or no relish which he said had never happen'd to him all the time of his being in India before, for these reasons, and his being troubled with a hiing (sic) to vomitt, I consented to give him one which I did on Fryday the 25th August about 7 in the morning, twas four graines of Emetick Tartar, "tworkt in a quarter of an hour which he said was much sooner then such Physick used to do with him, but had done its opperation as we thought by nine the same morning; so desired me to go home, he went upstairs to sleep, but that night

when I came to see him he told me he had some motions with his Physick after I went away, but by 11 a Clock that forenoon its operation was quite over, he added that one might at Judge Dolben Chamber Mr. Afflack sent for some white Powder and gave him a Paper of it which he said did his stomach good for its sowerness and that it seemed to be Pearl or some such thing bidding me send him some like it, and the same bitter Drink which he had often taken before with success; on Sunday 27th August I took two cakes and a half of Pearl and when twas ground I put in a paper and sent it with a bottle of bitter Drink to Mr. Wheeler by my servant, this was at about 2 in the afternoon, and he being asleep his servant put it up till he wakt, on Monday morning about 5 a Clock he took a small wine Glass of the bitter Drink, and as much of the Powder of Pearl as would lye on a Rupee; but about 2 hours after he found himself ill, and began to Vomitt, so sent for me when I came I was surprized to see him vomitting with a Bason full of the yellow stuff before him, he told me he had vomitted twice as much of the same Humour and that twas very bitter for the most part yett sometimes some sower trace would come up to, he added that he beleived the Bitter Drink to strong, upon which: I drank a Glass of double the quantities of wt: he took, and would have taken the Pearl to but he would not tell me where twas, but his vomitting continuing I conclud'd the Pearl had been ground in the same morter not washed where some days before I had had Arsnick beaten for Peter Toris Cancer and ther fore immediately sent for Mr. Bulkley and Communicated my thoughts to him so we concluded to give him Oyle Olive to hinder further Corrosion and salt of Tartar in broth to sheath the Poynts of the Arsnick while we were getting his ready some of his servants which heard wt: I said to Mr. Bulkley were whispering Poyson, which as soon as Mr. Wheeler heard he was struck with; so much terror that he fainted away allmost, but coming to himself a little he cryed Death had seized one of his leggs and soon after expired, I think twas then past 10 a Clock but cannot justly tell beleiving that the Pearl being beat in the Arsnick morter did so distract me I could not rightly consider of anything and in the midst of that fitt of grief writt that note to your Honour; desireing not to survive my Friend whose sudden Death I then though my fatall carelessness had procured but afterwards examining the matter twas by Doctor Bulkleys Prentice the Hospitall Coolleys, my own servants, that the white stone Morter in which the Arsnick was beat was not at my House all that day in which the Pearl was ground for Mr. Wheeler which did a little compose my mynd

so that I enquired of Mr. Bulkley who opened the deceased how he found his Viscera who told me that neither his stomach nor gutts were Corroded, and much about the same time the French Padre Frai Michaell came to me and told that a Woman of a very healthy constitution dyed the same day Mr. Wheeler did of vomitting she was taken ill at 10 in the morning and dyed the same day about noon without takeing any sort of Physick, this report being confirmed by many evedences who alsoe instanced two more who dyed about the same time yet; is to say a day or two after, these things put together when my distraction was a little over made me consider yet; Mr. Wheeler complained of little or no paine, when I first came and no drought all along, so that twas possible he might dye a sudden death, and his Physick not procure it, which yesterday I was thoroughly convinct of by giving ¾ of the remaining Powder of Pearl (which Mr. Wheeler tooke some off) to a little dogg which though it was about 3 times so much as Mr. Wheeler took yet it had no opperation on the Dogg who is now alive and well; but indeed tho this experiment together with that on myself with ye: bitter Drink and the foregoing circumstances has quite cleared all my scruples yett it leaves so lively a sence of the Almighty correcting my Follies by this lamentable accident that I shall for the future assiduously labour for Gods Blessing on my sincere endeavours to be more diligent and cautious in my Business as to the other and ys: world.

Honble Sr: Your obedient humble servant,

SAMUELL BROWNE.

* * * * *

The ultimate outcome of the trial is thus reported to the Hon'ble Company by Governor Higginson:

> As soon as Mr. Wheeler dyed Dr. Brown wrote a note to the President that he murthered Mr. Wheeler by giving him Arsenick whereupon he was examined and upon his own confession brought to a tryall but discharged by the grand jury so that the particular circumstances were not examined in court but upon the best inquiry that we have made since and upon the report of those who saw Mr. Wheeler's body opened we do not find any reason to contradict any point of the Doctor's narrative or to suspect that he had any design to do Mr. Wheeler any mischief between whom there was an intimate friendship.

Fort St. George,
4th Sept. 1693.

NETHLL. HIGGINSON.

* * * * *

DR. BROWN FIGHTS A DUEL AND IS COMMITTED TO CUSTODY

Leut: Seaton acquainting us he heard of a quarrell between Dr. Browne and Dr. Blackwall, upon wch: Dr. Browne was gone to a garden wth: a sword, he is ordered to take a guard and bring them both to us, and he returning presently with him reports that he found Dr: Blackwall at his house, and Dr. Browne returning from the Garden, upon examining them they agreed yt: there were words of quarrell between them at Dr: Blackwalls House, but that Dr: Blackwall did not goe from his House. Dr: Browne appeareing to have drunke to much and not capable of an examination It is ordered that he be committeed to ye: Custody of ye: Guard in ye: Fort, and that tomorrow morning the Mayor doe examine the parties and witnesses and that if it shall appear that one or both did give or receive a challenge, that the Person so offending be committed to ye: Custody of the Marshall till next Consultation day.

This was in November 1695, and the doctor seems to have been quiet for sometime after this incident. But his nature and temperament and his activities were such that he could not avoid getting into troubles frequently. In April 1696, he was again committed into the custody of the Marshall.

"Complaint having been made by Madrantala in a letter to the Governour received last night that Doctor Brown had gone to the house of Ananta Terterra his Junkanneer or Ipere and carried him away by force, and robbed him to the value of six thousand Pags: as by a List sent Doctor Brown being sent for gives this accot: that on Saturday having rid out to Yegmore in Company, in their returne by the Ipere Choultrey the moors Peons called him names, and he rideing up to them to demand the reason there followed more aggravating words and beat him, when he came home being informed where the Chief man of the Choukey lived, he tooke his sword and Pistoll and being followed by his boy with another Pistoll and his Housekeeper went to the house and by force took out Ananta Terterra and brought him to the Bridge gate, where understanding that that was not the man which had abused him, let him goe.

Ananta Terterra doeth allso further complain that Doctor Brown broke his face wth: a Pistoll pulled his beard &ca: and was robbed to the value of six thousand Pags: which tho there is noe Reason to believe, yet the Duans Officers will take occasion to make a demand as accustomary and give us trouble by complaining to ye: Nabob and Dr. Brown being apparently guilty of a breach of the Peace, It is resolved that he be committed to the Custody of the Marshall that others may be deterred from the like, and that the Inhabitants may understand that such practices are not allowed."

Dr. Brown was in custody for one week. This must have given him time for self examination and remarks. On 4th May,

the Council of Fort St. George considered the case "Doctor Brown having Petitioned for his liberty and allso severall Patients, in consideration of their suffering for want of his assistance, It is resolved that he be discharged from his confinment giveing security to the Judges satisfaction."

Brown's generous nature sometimes led him into difficulties. There is at least one instance where his intervention helped a Frenchman. In the middle of 1693, Pedro Pares, a Frenchman of the Fort Garrison, ran away to the camp of the Moors. Dr. Brown who was then there brought him to Madras. The truant hesitated to come in till the pardon was assured. Dr. Brown gave the Council and Governor an assurance of the good intentions of the man to serve the Company faithfully for the future. After this, pardon was granted. In one instance, where Brown stood security, he had more trouble. In July 1697, the Council made the following entry "Mr. Charden and Dr. Brown being sent for and demanded of them to produce Mr. Masson for whose appearance they had given bond the 15th May 1696, in one thousand pags, but they both answered they knew not where he is whereupon the bond being produced and the penalty demanded, Mr. Chardin declared he was ordered by Mr. Masson not to pay it except compelled; and Dr. Brown doth declare that when he signed the bond, Mr. Chardin did assure him that he had sufficient effects of Mr. Massons in his hands to save them harmless." It was ordered that the Bond be put in suit in the Court of Admiralty against Mr. Chardin.

* * * * *

Dr. Brown as a Diplomat.

Brown's personal relations with some of the Mohammadan princes and leaders gave him a unique position. A letter from Johannes Potuliat (Physician to Prince Arram Tarra) to Governor Higginson says "Dr. Brown hath given me understand that your Honour hath a request to his princely court, doeing this be arrand all shall be consented to.." Another letter from the same physician to the Governor about a week later adds "I lately advised your honour (by Dr. Brown's wife) of the Prince's order." Another instance of his capacity to negotiate with the Mahommadans around Madras is mentioned in the records of 1693. We read that the *Junkanner* had sent a message to Dr. Brown and that he was ordered to ride out that way and tell him the Governor would hear no proposals till the goods were delivered. Dr. Brown reported that upon

his delivering the answer the *Junkanner* ordered the delivery of the goods to him to bring with him but one Bensee, his Gento Conacopalle advised the *Junkanner* to stay. Next day 16th, Dr. Brown brought with him 21 bundles of cloth accompanied with 3 of the *Junknners* servants.

Brown as Havildar.

Dr. Brown was in the camp of Cassim Khan in the first half of 1693. A *parvana* from Cassim Khan to the Captain of the English and dated 27-7-1693 states "Dr. Samuel Brown has all this while been at my camp and has wrought many good cures here—lately I have given him leave to go to Madras...." The return of Dr. Brown from the Moor's camp is again alluded to, in a consultation dated 7th August 1693. "Dr. Browne coming lately from the camp where he has been deteained sometime by Cassim Khan...."

On his return from the Moor's camp in July 1693, Browne brought the news that Cassim Khan was appointed Nawab of the country. The New Nawab granted a Parwana to Dr. Browne, for the renting of 6 towns adjacent to Madras. A letter from Goldsborough to Governor Higginson says: "I would not think fit for Dr. Browne to be the Rt. Hon'ble Company servant whilst he becomes Havildar of any towns." The Council also considered that it was not expedient for Dr. Browne to enter upon the Towns, because the rent payable is not mentioned and the old Nawab Zulpheker Cahn was still in possession of the Government. Translation of Parvana referred to, in the consultation dated 7th August 1693 reads:—

> All Desmook Deponde Chief inhabitants.....belonging to Golconda Country, be it known to all people the towns that are mentioned in this writing, I have lett out to rent to the English Doctor Samuel Brown. You all must understand that he is now your head renter all the revenues that formerly belonged to the Duan (Dewan) you are all to see and make it good to Dr. Brown's servants according to list and act according to Sallabad and you are to obey all such orders as he shall give you that are reasonable. Dr. Brown's duty is this that he see and give content to all his inhabitants under him and duly see to increase the revenues of the towns under him. You must all be sure to act according to this Parvana dated.....
>
> List of the names of the towns.
>
> | | |
> |---|---|
> | Trivetore, | Ernavosur, |
> | Santungaud | Cuttuwacaw, |
> | Saudium Cuppam. | Aleunda Cherre. |

Brown seems to have continued on good terms with the Moors. Potuliat wrote in December 1693 to Higginson. "Please to send me two chritiall glasses for a lantern of good work, such as Dr. Brown had sent him." Brown was also deputed to cure the wounds of Nabab's Officers. An Officer who had been dangerously wounded in Cassim Cawn's Country fighting with the Poligars coming to Town sent his brother to the President desiring that a doctor may cure his wounds. The President ordered the peons to find them a convenient place for their lodging and sent Doctor Browne to cure his wounds. The officer was to bear his own charges.

Brown's Work as a Medical Man.

He was in charge of a hospital. The commodious Hospital building by the side of the church was converted into quarters for factors. The temporary hospital was located in James street in the house of Pois. The new hospital by the riverside was completed about 1690. It was built on a site at the north end of the barracks. The cost of the new building amounted to Pagodas 2,500. The vestry spent the greater part of the money it received by the sale of the old hospital. Yale, who was then the chief at Madras, himself advanced a further sum of Pagodas 1700. The hospital is said to have been a handsome edifice built like a barracks in the Tuscan style. The scope of the hospital and the financial responsibilities are indicated in the following passage in a consultation dated 8th December 1698 :

> "Resolved for the future they (the Vestry the church wardens and ministers) are discharged from contributing thereto and only to pay the charge of such sick persons as they shall send hither." The Council offered to bear all the charges of the Hospital and directed that thereafter the Chirurgeon or Steward of the Hospital, render a monthly account to the Paymaster of the charge of the said Hospital.

The records contain a number of bills presented by Brown, as contingent expenditure for "bazar medicines."

(1) 2nd August 1695 :—

> Ordered that the Paymaster do pay Pags. 11, 7, 26; to Doctor Brown being for drugs brought by him from the Bazar for 8 months as per his account now delivered.

(2) 16th December 1695 :—

> Paymaster producing an account of drugs brought by Dr. Brown in the Bazar for 6 months ending the ultimo November last amounting to pag. 12, 7, 45; it is ordered to be paid.

(3) 31st August 1696 :—

Dr. Brown presenting a bill amounting to Pags. 19, 22, 48 for drugs brought in the bazar and for 8 months ending July last. The Paymaster was ordered to pay the same.

(4) 14th June 1697 :—

Paymaster was ordered to pay Dr. Brown's bill of ditto (drugs brought in the bazar for use of the Hospital) from 1st August 1696 to 30th April 1697 amounting to pags. 18, 4, 4. This bill provoked the Council to make anew rule that, " for the future, the doctors do produce their bills monthly."

(5) 16th February 1698 :—

Ordered that pags. 10, 7, 58 be paid to Dr. Brown being for drugs bought by him in Bazar for 7 months ending November last. This bill leads us to infer that the rule about monthly bills was not observed by Brown. This bill covers the last few months of Brown's service as Surgeon of the Fort Hospital.

ADDITIONAL DUTIES AND WORKS ENTRUSTED TO DR. BROWN.

1. Brown examined along with Dr. Buckley, Mr. Nicks who was under confinement and signed the joint certificate, about the delicate health of the prisoner and recommended release for the sake of health.

2. An entry dated 31st July 1693 states: " Ordered that the warehouse keeper do deliver to Dr. Brown two maunds of salt petre and four maunds of copperice to make Aqua Fortis for the use of the Assaymaster." So, the Scalpel had to be laid aside now and then to take a flask or test tube.

3. In February 1697, the Council asked Dr. Buckley and Brown to view the chest of Medicines for Fort St. David and West Coast, in the presence of Warehousekeeper who is to take care that they take nothing out of it. So, the Inspectors were to be watched!

4. The Council ordered Dr. Buckley and Brown to view and report on a parcel of " Gallingal " brought from China.

A report was sent that the material was good.

BROWN'S FAMILY.

We have no means of knowing when Brown was married. Col. Crawford writes that Browne married Ann Baker in 1688.

An entry in the year 1695 states that Dr. Brown was the recipient of a share in the butt of Sherry divided among the Company's married servants. His share amounted to 15 gallons. Brown's children are mentioned in a record of 1697. "Mr. Proby and his wife, Mrs. Brown and their children being still at the mount, the Governor permitted Dr. Brown to go this evening with Palankeens and Coolies to fetch them and ordered them to go by Junkanneers chief mett and acquaint them with his business to the mount but if they refused to let him pass, he was strictly ordered not to offer any violence but to return." An entry dated next day reads "This morning Dr. Brown came back from the mount with his wife and family and passed by the Junkanneer cheif mett without any molestation." Browne's daughter, Elizabeth, married Rev. Charles Long, Chaplain of Madras.

Brown's Contributions to Science.

The dictionary of National Biography states that Browne sent to England collections of dried plants which now form part of the herbarium of the British Museum. I humbly suggest to the University and to the post-graduate research students in Natural Sciences, to make detailed enquiries about Browne's collection and publish a monograph on the subject. As far as I know, Browne was the first medical man from Madras to take interest in the study and identification of plants. The planning and development of the garden for the cultivation of herbs and vegetable drugs as an adjunct to the hospital in the fort in the last decade of the 17th century, must have been partly responsible for this increasing interest of Browne in medical botany. That Browne was a man with intelligence, enthusiasm and also the curiosity of a born scientist is abundantly proved by the fact that he not only collected specimens but also sent them to England to enable other medical men and botanists, more learned than he, to study them and preserve them, for future study

Browne Manuscript or Dr. Browne's Journal.

Very few surgeons of the East India Company in the last quarter of the 17th century were in a better position than Dr. Browne to write his reminiscences or to leave a record of his work as a medical man. It is very unfortunate that there are at present no rerords of the hospital in the Fort where Dr. Browne worked for so many years. No detailed reports of cases treated by Dr. Browne in Madras, outside the hospital are available in contemporary writings, or official documents. Dr. Browne, however, has left a book of

case-notes. In the course of my search for the medical literature and medical manuscripts of the 17th century, I had a pleasant surprise, when I read of a manuscript in the British Museum and labelled as " Dr. Browne's Journal, Sloane Manuscript 1689 ". Dr. Shafat Ahmad Khan in his book "The Sources" supplied the information that the manuscript contains some details of a medical nature. The date of the journal is given as 1692. Dr. Browne was at that time at Madras and in charge of the hospital. After prolonged correspondence, I secured a photostat of some pages. The cost was very high. Subsequently, I succeeded in getting a typed copy of the portions of the journal, which contain notes of cases treated by Dr. Browne. The manuscript is therefore a rare one, being one of the few written in India in the 17th century, by medical men and giving details of the types of cases and modes of treatment common in Madras about the close of the 17th century. The copy in my possession occupies nearly 24 pages of closely typed matter and contains a number of archaic words, symbols and abbreviations which require a close study with the help of those versed in old English and the history of medicine. Dr. Browne may therefore be considered as also one of the earliest of the Company Surgeons to maintain records of the cases seen and treated by him at Madras. His journal is the earliest detailed clinical memoranda or report on the diseases of India in general and especially on the common diseases incident at Madras in the 17th century.

THE THEORY OF TWO KOPPERUNJINGAS

By

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In the last issue of this Journal (Vol. XII, July 1940, No. 2), Mr. Balasubrahmanyam, under the caption 'Kōpperuñjiṅga and the Villiyanūr Record,' asserts that there was only one chief of the name Kōpperuñjiṅga to whom all the records with the name Sakalabhuvanachakravartti Kōpperuñjiṅgadēva and with regnal years must be assigned. On the other hand, the evidence for postulating the rule of two chiefs with the name Kōpperuñjiṅgadēva is clear and definite.

The portion relevent for our evidence in the text of the Villiyanūr record which Mr. Balasubrahmanyam takes up for examination reads:—

> Iṉ-ṉāyaṉār kōyil Tribhuvanavīradēvaṟkku muppattēḻāvadu mudal Aḻagiyaśiyar Kōpperuñjiṅgadēvaṟkku padiṉoṉṟāvadu varai * * * * āṟāvadu Tai-mādattu Uḍaiyār Perumaṅgalam-uḍaiyār Udaiyapperumāḷāṉa Kāḍuveṭṭigaḷ kaṇakku kēṭṭu' i.e.,
>
> In the month of Tai in the sixth year (of Kōpperuñjiṅgadēva), Udaiyapperumāḷ *alias* Kāḍuveṭṭigaḷ of Perumaṅgalam, having enquired into the accounts of the temple of this god (i.e., at Villiyanūr) from the thirty-seventh of Tribhuvanavīradēva till the eleventh of Aḻagiyaśīyar Kōpperuñjiṅgadēva.'

This inscription does not specify whether 37 and 11 are to be taken as years, but Mr. Balasubrahmanyam would take 37 alone as year and 11 as day. If one figure is taken as year the other also must be construed in the same way, according to the construction of the sentence in the text. If the 11th day was really meant, it would have been clearly indicated by some such word as *tiyadi* as in l. 8 of the same inscription. Thus Mr. Balasubrahmanyam's interpretation of the record suffers from two main defects:—

(1) the auditing of accounts would be made from year to year, i.e., for whole years and not till a particular date

of a month. No such instance has so far been met with inscriptions; and

(2) the actual wording of the record does not warrant his interpretation either; he has, therefore, to make an emendation in the text which is not called for.

In this connection it may be pointed out that the 11th year of Kōpperuñjiṅgadēva I corresponded with the initial year of Kōpperuñjiṅgadēva II who was co-regent with his father during the last six years of the latter's rule.

A definite and indisputable evidence to prove the rule of two Kōpperuñjiṅgas is furnished by a record from Chidambaram (A. R. No. 103 of 1934-35). This inscription, dated in the 19th year of Sakalabhuvanachakravarttin Kōpperuñjiṅgadēva, refers to a flower garden called 'Śokkachchīyaṉ-kamugu-tirunandavanam' formed at Bhūpālasundaranallūr situated in Veśālippāḍiparṟu. In the concluding portion, this inscription is directed to be engraved on the same wall[1] where the original gift of *this* garden was recorded in the 15th year of PERIYADĒVAR. Fortunately the very same 15th year record is found on the identical wall indicated above (A. R. No. 467 of 1902); it refers to the same garden called 'Śokkachchīyaṉ-kamugu-tirunandavanam'; its extent of 63 and odd *mā* of land is also reiterated, and what is more to our point, the record itself belongs to Sakalabhuvanachakravarttin Kōpperuñjiṅgadēva, who can be no other than PERIYADĒVAR[2] mentioned in the other record.

The most important facts gleaned from the present inscription are that the elder chief was also known as Kōpperuñjiṅgadēva, that he had the title Sakalabhuvanachakravarttin and that he had an independent rule of 16 years.[3]

1. North wall of the second prākāra of the Naṭarāja temple.

2. *Periyadēvar* is a term of reverence to indicate the chief or sovereign who ruled previously. Kulōttuṅga-Chōla III and Rājēndra-Chōḷa III refer respectively to Rājādhirājadēva II and Tribhuvanavīradēva as *Periyadēvar* (A.R. Nos. 490 of 1922 and 216 of 1908), while Kōpperuñjiṅgadēva refers to previous Chōḷa monarchs simply as Kulōttuṅga-Chōla and Tribhuvanavīradēva without any respectful qualifying epithets (A.R. Nos. 95 of 1900 and 186 of 1936-37).

3. While publishing the 'Śēndamaṅgalam Inscription of Manavāḷapperumāḷ,' I assigned to this chief a rule of 11 years (*Ep. Ind.*, Vol. XXIV, p. 27), but now it has to be extended to 16.

This 'Śokkachchīyaṉ-kamugu-tirunandavanam' referred to above which is definitely known to have been formed in the 15th year of PERIYADĒVAR (Kōpperuñjiṅgadēva I) is again mentioned in a 3rd year record (A. R. No. 465 of 1902) of Sakalabhuvanachakravartin Kōpperuñjiṅgadēva who must be identified with Kōpperuñjiṅgadēva II.

A fortiori it may be stated that the *Periyadēvar* evidence supplied by the Chidambaram inscription[4] is conclusive and that the rule of two Kōpperuñjiṅgas may hereafter be taken as well established. In the face of this single evidence it is unnecessary to consider the other minor arugments raised by Mr. Balasubrahmanyam.

Finally, I agree with him in his identification of Kūḍal with the Kūḍal of Kaṟkaṭamārāyaṉ, but this is different from the Kūḍal of Kōpperuñjiṅgadēva, because the Kūḍal of the latter was in Kīḻ Āmūr-nāḍu while that of the former was in Puṟamalai-nāḍu. The phrase Kūḍal Avaṉiālāppiṟandāṉ Kōpperuñjiṅgadēva has to be interpreted as Avaṉiāḷappiṟandāṉ Kōpperuñjiṅgadēva of KŪḌAL.

4. I owe the suggestion of the importance of this record to my friend Mr. A. S. Ramanatha Ayyar.

No. 1. Vimāna. Panaṅguḍi Agastiśvara temple

PANANGUDI AGASTĪŚVARA TEMPLE

A Cōḷa Temple—9th Century A.D.

By

S. R. Balasubrahmanyan, M.A., L.T.,

and

K. Venkataranga Raju.

We propose to discuss in this paper, a temple of the 9th century A.D. which can be assigned to the period of Vijayālaya, the founder of the Cōḷa house of Tanjore. Most of the Pallava Temples have more or less been fully explored and dealt with in the publications of M. G. J. Dubreuil and in the memoirs of the Archaeological Survey. But the temples of the transition period from the age of the later Pallavas to the days of the imperial Cōḷas are an unexplored field. We have identified a few temples belonging to this period of early Cōḷas,* and the Agastīśvaram Uḍaiyar temple at Panaṅguḍi should be added to this list of early Cōḷa temples.

Panaṅguḍi is a small and obscure village in the Koḷattūr Taluk of the Pudukotah State. It is south of Śittannāvāśal (about 9 miles

(a) *Vijayālaya's (acc. Circa.* 850 *A.D.)*
(1) Vijayālaya Cōḷīśvaram—Nārttāmalai
(Journal of Oriental Research, Madras), Vol. VII, Part IV, pp. 351-358 and Vol. VIII, Parts II and III.
(2) Kāḷiyāpaṭṭi Cōḷīśvaram:
(J.O.R.M., Vol. XII, Part I).
(3) Tiruppūr Cōḷīśvaram:
(J.O.R.M., Vol. XII, Part IV, pp. 300-302).
(b) *Āditya's (acc.* 871 *A.D.)*
Kaṇṇanūr—Subrahmanya temple:
(J.O.R.M., Vol. XI, Parts III and IV, and Indian Historical Quarterly. XV).
Tirukkaṭṭaḷai—Sundareśvara temple:
(J.O.R.M., Vol. X, Part III, pp. 231-239)
(c) *Parāntaka's (acc.* 907 *A.D.)*
Uṟumūr (Eṟumbūr)—Kaḍambavaneśvarar.
(To be published in the Journal of Indian Society of Oriental Art, Calcutta).

N.W. of the capital), a place which is famous as a great centre of Jainism, wherein is found a remarkable rock-cut cave temple of the days of Mahēndravarman Pallava in which unique fresco paintings of the 7th century A.D. have been discovered. The Śiva temple called Tiru-agastīśvara is situated on the southern bund of the tank of the village of Panaṅguḍi.

The temple (Illus. No. 1) is a small, compact and beautiful edifice built completely of well-dressed and close-fitting granite blocks similar to the temples of Kāḷiyāpaṭṭi and Tiṟuppūr which we have already dealt with (J.O.R.M. XII Parts I and IV). It faces east.

The temple consists of a *Garbhagṛaha* 9 ft. square on plan externally and 5 ft. square internally and a closed *Ardhamaṇḍapa* provided with a small entrance in front. There is a *Mukhamaṇḍapa* 25 feet broad attached to the temple in front of the *Ardhamaṇḍapa* whose moulded basement is found imbedded below the surface of the ground.

There are also the basement of the *Nandimaṇḍapa* and traces of one of the sub-shrines round the central shrine.

The walls of the central shrine are adorned externally with a series of pilasters, each surmounted by *kalaśam, kumbham, padmam* and *palagai* all four-cornered and decorated with elegant scroll-work. The *corbels* above the pilasters are plain and angular in outline. Unlike the temples of Kāḷiyāpaṭṭi and Tiṟuppūr, there are niches for idols (Koṣṭa) in this edifice and they are crowned with double arched *makaratōṟaṇas*. But there are no idols in the niches at present. The *cornice* above the walls is thick and single arched and is provided with *Kūḍus* crowned with tri-foliated pieces of stone. All its corners are decorated with scroll-work. Below the cornice there runs a frieze of *Bhūtagaṇas* and above it a frieze of Vyāḷa Vari, and makara heads jut out in places where the frieze bends into angles.

The *grīva* is four-sided and is provided with four niches surmounted by *Kūḍus* and *Simhalalāṭams* one on each of the four cardinal points. There are Indra in the east, Dakṣiṇāmurti in the South, Viṣṇu in the West and Brahmā in the North. Each of the figures measures 1′ 2″ in height.

The *Śikhara* is four-sided and curved and is crowned by a four-sided stone finial (stūpi—crown broken) resting on two stone slabs of which the lower is ornamental at the edges and the upper

No. 2. Jyēṣṭa Devi

is drawn out into lotus petals. This Śikhara resembles those of Kāḷiyāpaṭṭi, Tiṟuppūr, Tirukaṭṭaḷai and Koḍumbāḷūr.

The whole of the exterior should have been covered with plaster and polished in stucco and traces of these are still visible in some places.

A few stone images—of Jyēṣṭā Dēvī (Illus. No. 2), Vināyaka, a nāga, four bulls of the griva—are found on the ground, some half-buried.

It is usual in the early Cōḷa temples to include round the main shrine sub-shrines for the *Aṣṭa-Paṟivāṟa* Devas as recorded in an inscription of the Eṟumbūr temple—Sūrya, the Sapta-mātṛkas, Gaṇeśa, Subrahmaṇya, Jyeṣṭā, Candra, Caṇḍikeśvara and Nandi. But the cult of the Sapta-mātṛkas and Jyeṣṭā Devī fell into disrepute in later times and these idols have almost disappeared from modern temples. Such of the early Cōḷa temples as remain untouched by renovators still retain these sub-shrines as at Tirukkaṭṭaḷai. While in a few we find these sculptures lying loose in compounds of temples uncared for and without the benefit of worship. The queen of the Pāṇḍya King Jaṭila Parāntaka excavated a shrine for Durgā on the rock at Tiruppaṟaṅkuṉram (Maḍura district) and she got sculptured an image of Jyeṣṭā Devī as well. In an inscription of Rājēndra I at Eṉṉāyiram (South Arcot district—325 of 1917) we find mention of the shrines of Jyeṣṭā Devī and the Sapta-mātṛkas.

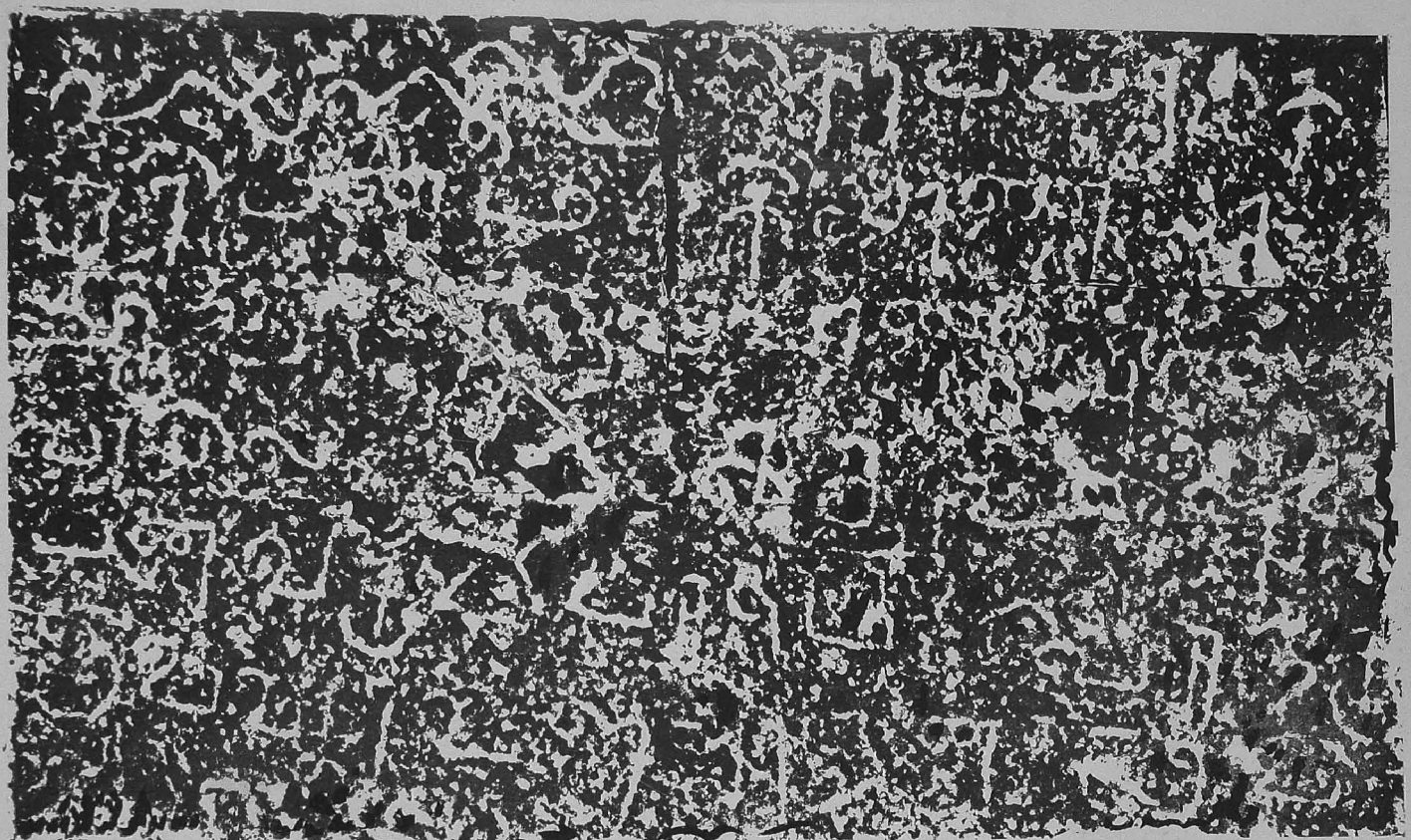
There are two published inscriptions belonging to this temple. One of them is an incomplete record containing only a part of the historical introduction of Kulōttuṅga III and the other of the 4th year of the Pāṇḍyan King Māṟavarman Kulaśekara Dēva. But on closer inspection during our visit (on 8-6-1938) a new unpublished inscription was noticed on the north wall of the shrine. The text of the inscription (Illus. No. 3) is as follows:

1. Śvasti Śri Kōpparake.....
2. Sari pammarki yāṇḍu 14
3. āvadu ivvāṇḍu Aṉṉal
4. Vāyil kūṟṟattu (Ūṟōm ?)
5. Panaṅguḍi Paramesvaṟaku
6. ivvūṟ..... ,

Except the regnal year and the name of the monarch nothing can be gathered from this incomplete record. Still it is valuable, as it helps us to reinforce the other arguments to fix the age of

the monument. It relates to the 14th year of a certain Parakeśa i-varman. On palaeographical grounds the inscription can be assigned to the 9th century A.D. or early 10th at the latest. The existence of the temple in that period is beyond dispute. But its architectural features resemble those of Tiruppūr and Kāḷiyāpaṭṭi, which we have assigned to the period of Vijayālaya and this temple also has to be assigned to the group of Early Cōla temples of the age of Vijayālaya Cōḷa (acc. Circa A.D. 850). As in the case of Kāḷiyāpaṭṭi and Tiruppūr (also of Viśalūr not yet published) the temple of Panaṅguḍi is built wholly of stone—and resembles the others in size and style of construction. The Stūpi and the Ardhamaṇḍapa are missing in the temple of Kāḷiyāpaṭṭi; only a portion of the Śikhara is found in the temple at Tiruppūr. But at Panaṅguḍi we have all the original features of the temple intact. But unlike Kāḷiyāpaṭṭi and Tiruppūr there are niches for idols on the walls of the Garbhagṛha of Panaṅguḍi. Hence this temple of Panaṅguḍi is of great importance among the early Cōḷa temples.

Fortunately most of the temples in the State of Pudukotah still retain their pristine glory and therefore offer an attractive field of study for the antiquarian.



No. 3. Newly discovered inscription
14th year of Parakesaripanmar

IS THE GĪTĀ A GOSPEL OF WAR ?

By

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The pacifist who believes in the teaching of the Gītā has to meet the charge which is often levelled against the Song of Kṛṣṇa, that it is an exhortation to violence, a gospel of war. The charge is neither new nor flippant. In the Parapakṣa of the Śivajñāna-siddhiār, Aruḷ Nandi argues that the Gītā is on a par with the Bauddha works in that it is a book of guile, and says that when Arjuna refused to fight his own kinsmen, Kṛṣṇa who wanted that they should be killed used a specious argument by telling the Pāṇḍava hero that he, the Lord himself, was responsible for the killing and not Arjuna.[1] We shall first state the case for regarding the Gītā as a gospel of war, then examine the possible answers to the charge, and lastly make an attempt to interpret the Gītā-teaching consistently with the doctrine of ahiṃsā.

I

The case for regarding the Gītācārya as an advocate of war is based on the incidents of the Mahābhārata that culminated in the fratricidal battle and the words of counsel that he gave to the despondent Arjuna. The Gītā opens with a scene on the battle-field of Kurukṣetra at the commencement of the Great War. Arjuna desired to have a near view of his opponents. And so he requested his divine charioteer to lead his car and station it between the two armies. When this was done, Arjuna saw before him teachers, friends and kinsmen whom he had to kill. Though he had known already whom he had to meet in battle, he realised the ghastliness of this act of war only when he was face to face with his foes who were but his kinsmen and friends. Overcome with pity, he dropped his bow and refused to fight. This was a moral crisis of great magnitude. To fight or not to fight was the question. Upon this depended the fate of millions of lives.

1. The substance of Aruḷ Nandi's argument is given, and not a literal translation of the verse.

Instinctively Arjuna felt that to fight was wrong. He thought that it was better for him to be killed in war unarmed and unresisting than to kill his own kith and kin. True, Duryodhana and his compeers were in the wrong. They were evil-hearted men overpowered by greed. But to kill them was also wrong. And two wrongs would never make a right. If one had in mind the disastrous consequences of a war, one would not go to battle, whatever be the cause. Society would come to ruin with the destruction of its elders and youths; there would be lawlessness, confusion of orders, immorality and consequent degradation and degeneracy. And so was it not a sin to have resolved to go to war? What after all was the cause? The ostensible reason was the wickedness of Duryodhana. But was not the real reason 'Our greed for the pleasures of the kingdom.'?[2] Arguing in this way and overwhelmed by grief, Arjuna told Kṛṣṇa that he was not for the fight.

It is true that the Pāṇḍava hero was not motivated by any absolute standard of morality. He felt that he should not kill his kindred (svajana). If his foes had been strangers, perhaps he would have nonchalantly finished with them. But that does not make his resolution wrong. He was right in so far as he thought that it was immoral to kill one's own kinsmen. Kṛṣṇa, if he were the Lord of Peace, should have complimented Arjuna on his wise resolve and prevented the carnage and blood bath. But on the contrary, what he did was to chastise the hero for his meekness, and make him fight by appealing to his Āryan valour, by specious metaphysical arguments, and even by intimidation and threat.

Kṛṣṇa begins his discourse by rebuking Arjuna for his ignoble, disgraceful, and heaven-barring loathsome feeling. An Āryan fighter should never yield to weakness and faintness of heart. To him there is no higher good than a righteous war. A true Kṣatriya should be delighted when such an opportunity presents itself before him and should regard it as an open door to heaven. To run away from a war of this kind is not only cowardly and dishonourable but also sinful and immoral. Victory or defeat, Arjuna should fight. If he fell, he would go to heaven, if he won, he would rule the earth.[3] Even on metaphysical grounds Arjuna need not be afraid of war. After all, who is the killer, and who is killed? Not the soul. For it is unborn, eternal, ever-lasting and ancient; it is not

2. *Gītā*, I, 45.
3. *Gītā*, II, 2, 3, 31-37.

slain when the body is slain. "He who thinks it slays, and he who thinks it is slain—neither of them knows it truly. It neither slays, nor is it slain." If Arjuna should think that the soul is subject to births and deaths, even then there is no room for sorrow. Whatever is born is sure to die, and whatever dies is sure to be born again. Why then should he grieve for what is inevitable?[4]

Kṛṣṇa's appeal to Kṣatriya valour cannot be justified by the codes of higher ethics. To fight in battle is bravery, no doubt. But to die unresisting requires more courage. And this was what Arjuna proposed to do. The metaphysical argument advanced by Kṛṣṇa is pointless. On the ground of the indestructibility of the soul any war can be justified and no act will appear to be unethical; for is not the soul non-active? Kṛṣṇa did not stop with mere arguments. He had recourse to intimidation and threat. He revealed to Arjuna his 'aweful' form with a thousand faces and myriad eyes. The devotee saw the sons of Dhṛtarāṣṭra together with the hosts of kings, Bhīṣma, Droṇa, Karṇa and the leading warriors, all rushing into the flaming mouths set with terrible fangs. He saw some of them caught between the teeth and their heads crushed to pieces.[5] Kṛṣṇa's plan succeeded. Arjuna got unnerved and became completely docile. He was told that he was not the killer, for the work had been accomplished already by the Lord. Arjuna was to serve merely as an instrument (nimitta), an apparent cause.[6] And at the close of his discourse, Kṛṣṇa informed the Warrior that all his resolve not to fight would be futile. "If indulging in self-conceit you think, 'I will not fight,' vain is your resolution. Nature will compel you."[7] Subsequently, no doubt, he asked Arjuna to consider the pros and cons fully and act as he desired. But this advice was to no purpose, for it came only after Arjuna's demoralisation had been complete. This is evident from the reply which he gave: "I shall do thy bidding".[8] As a result of this teaching Arjuna did fight, and the war was waged to its bitter end. Such is the argument of those who hold that the Gītā is a gospel of war.

II

It is possible to answer the charge by admitting that the substance of it is a contingence of the acceptable (iṣṭāpatti). The

4. *Gītā*, II, 12, 13, 16-27.
5. *Gītā*, XI, 26, 27.
6. *Gītā*, XI, 33.
7. *Gītā*, XVIII, 59.
8. *Gītā*, XVIII, 73

central teaching of the Gītā is that all should perform their respective duties (*sva-dharma*). The word '*sva-dharma*' in the Gītā connotes varṇa-dharma, viz. the duties of the main classes into which society is divided. The duties of a Kṣatriya are: heroism, vigour, firmness, resourcefulness, dauntlessness in battle, generosity and majesty. He is the guardian of society, its protector and preserver. He is the soldier who fights for the freedom of the race and the prefect who keeps the peace of the land. He has to save the social polity from internal dissension and external aggression. Ahimsā is a virtue only with those who belong to the last two stages (āśrama) in life, vānaprastha and sannyāsa. Arjuna who was a Kṣatriya in the second stage of life wanted to pursue the ideal of the vānaprastha and the sannyāsin. He desired to sacrifice his own dharma and embrace another's dharma; and that was clearly wrong. An action enjoined by Scripture, though it may entail injury, ought to be performed. The warrior has to welcome a righteous war and do his duty, though it may involve the killing of his own kindred.[9] There can be no greater boon to him than the opportunity to fight for a good cause. As the Gītācārya says, it is a door to heaven. The Lord of the Gītā advised Arjuna to fight in strict accordance with the Scriptural Law. When all other means of bringing Duryodhana to his senses had failed, there was no option but to wage war against him. The use of force is not only sanctioned but enjoined in such cases. Śrī Kṛṣṇa, the sole purpose of whose advent was to establish dharma, could not but give the advice which he did give to Arjuna.

A different line of argument may be pursued in reply to the charge against Śrī Kṛṣṇa's conduct. Śrī Kṛṣṇa was the incarnation of God. He came to the world for a set purpose, *viz.*, the protection of the good and the destruction of the wicked. This divine plan "must be carried out, at whatever cost for the moment, by those who are His agents in the work." Arjuna was the chosen instrument; and he would be made to fight whether he willed or no. Willing co-operation on his part would bring him the greatest good, while unwilling obedience would spell his own destruction. Śrī Kṛṣṇa was Time (Kāla) made manifest to destroy Duryodhana and his allies. The time had come when, for the good of all humanity, these obstructive objects should be swept away. This was the divine Will; and wisdom on the part of Arjuna re-

9. Śrī Śaṅkara in his Commentary refers to this view as a pūrvapakṣa. See Memorial Edition of Śaṅkara's Works, Vol. 11, p. 18.

quired willing obedience to the Lord's command. The ordinary codes of morality cannot be applied to Śrī Kṛṣṇa; for he is above Law and the promulgator of Law. If a man kills another out of his own will, then he is immoral. But if he does so, prompted by the divine Will, then he is not to be blamed. Non-violence is a general rule. The call to violence was made by Śrī Kṛṣṇa as a special command. As between a general rule and a specific injunction, the latter should be preferred. And when that injunction comes from either Scripture or God, there is no sin in carrying it out, however unethical it may appear to be. On the contrary, sin will accrue if it is not obeyed. Śrī Kṛṣṇa asked Arjuna to rise above the ordinary distinctions of good and bad. "Surrendering all dharma come to me alone for shelter. Do not grieve, for I will release thee from all sins."[10]

A third line of approach is as follows. To mistake Arjuna's attitude at the commencement of the Great War for that of a true satyāgrahi is to miss the import of satyāgraha. Arjuna's resolve was born of weakness and not of strength. He had no objection to killing as such; he only recoiled from killing his kinsmen. The advice which Śrī Kṛṣṇa gave him was of course to do his duty on the battle field. But at the same time he undermined the ground of violence. He wanted Arjuna to fight without anger, fear and hatred, to remove every trace of selfish desire from his heart and to have the same regard for friend and foe. If these conditions were satisfied, the spirit of non-violence would have been achieved. Śrī Kṛṣṇa did not advocate the abolition of war as a means of settling disputes because the time was not ripe for it. All the same the substance of violence was taken away and only the outer shell was retained. By his teaching he tried to change the whole mental back-ground of the fighting man into one of pure non-violence, while he kept only the external physical form of violence.[11]

It will be evident that the answers suggested above are unacceptable, either wholly or in part, to the pacifist. Evil must certainly be resisted. But is not non-violent resistence more in keeping with the spirit in man than violent means? "Non-violence is the greatest force at the disposal of mankind. It is mightier than the mightiest weapon of destruction devised by the ingenuity of man. Destruction is not the law of the humans. Man lives freely only by his readiness to die, if need be, at the hands of his brother,

10. *Gītā*, XVIII, 66.
11. See Sri D. S. Sarma: *Krishna and His Song*, Ch. II.

never by killing him."[12] Judged by this standard, the first two answers suggested above are unsatisfactory. If these were the only possible explanations of the Gītā-teaching, then the pacifist would rather disclaim his faith in the Gītā than renounce his principle. As regards the third view, it is defective because, in so far as it admits the retention of the shell of violence by the Gītācārya, it tacitly avers that the Celestial Song is imperfect. To avoid all difficulty it has been suggested that the Gītā episode is to be understood as an allegory. The battle of Kurukṣetra is the battle of life raging in the heart of every one. The dialogue is between the apparent self and its *alter ego*, the real Self. And the central doctrine is a call for sublimation of all the lower instincts and passions for the sake of reaching perfection. In the remaining part of this paper we shall see if it is possible to read a meaning into the Gītā so as not to do violence either to its teaching or to the doctrine of ahiṃsā, without resorting to allegory.

III

Let us first apply the pragmatic test to the Gītā. What feelings does it arouse in the mind of its reader? It certainly does not inspire the feelings of hatred and anger which are the spring of violence. On the contrary, every honest student of the Gītā feels that it teaches equanimity, freedom from malice, lust and hate, and devotion to duty without counting the costs or calculating the advantages. To believe that the Gītā was preached for the specific purpose of asking Arjuna to fight is to miss the entire purport. It has been said that the Gītā is " the most beautiful, perhaps the only true philosophical song existing in any known tongue ".[13] " In point of popularity the Gītā is second to no work in the world of Indian thought. It has always commanded great admiration and its popularity now, if anything, is on the increase."[14] All this eulogy would be meaningless, if the Gītā were a book of exhortation to violence.

The Gītā is not a mere dharma-śāstra; it is a mokṣa-śāstra. Its primary aim is to save the soul from the slough of saṃsāra. It begins by setting forth the real nature of the Self which is unborn and eternal and proceeds to explain the paths to its realisation. It is attachment to objects born of delusion that binds the soul. Man's

12. Mahatma Gandhi in the *Harijan*, July 20, 1935.
13. William von Humboldt.
14. Prof. Hiriyanna: *Outlines of Indian Philosophy*, p. 116.

ful cultivation of tastes and a calculated indulgence of passions should be the governing policy in life. "No God must be cheated and none overpaid." This, in short, is the creed of the scientifically illumined.

There are a number of scientists who are humanists. They want men to lead a good life but not a godly one. The good life is enough. If we are kind and tolerant, good tempered and unselfish that is enough. Amiability and good will can save men from troubles. This school of thought asks us not to rely on the super-natural, but subordinate the selfish in us. They exhort men not to interpret the universe but to change it. They suggest definite blue prints for the salvaging of civilisation. They say that 'life on this earth is something definite and let us make it better;' let us make two blades of grass grow where there was one.

Marxism and Psycho-analysis are the two secular religions of our moderns. Marx held that religion devitalises men. He described it as the heart of the heartless world, the soul of the soul-less-conditions and the opium of the mind. Religion is said to perpetuate the iniquities of the present social order. They link the rise of religion with capitalism. They account for the existence of reactionary spirit, rickety institutions and social indifferentism as due to religion. The complacent acquiescence of men in the existing social order as necessary is said to be due to religion. To get rid of all these things Marxism asks us to give up religion, and believe in class-war, materialist interpretation of history, i.e., that the economic is the chief factor in the determiniation of the events in history. The whole of reality according to Marx moves in a definite pattern. The validity of this statement is on no greater level than the fundamentals of any theology. Marxism is the first of the false religions of our age. The paradise they hope to realise is a class-less society where the individual has no private life or objective of his own except those set forth by the state. Communism as a secular religion does not satisfy what is deep in men. It is too simple a solution of the complex activities of men. It is a mere caricature to reduce the aspirations, heroism, sacrifices etc., of noble men and women to factors of money power. Communism is anti-human. It is the attempt of a military minority drunk with the ideology of a partial Realist to mould the opinions of a population forcibly in accordance with a preconceived pattern like a gardener who cuts the grass to the shapes of peacocks. Men are not allowed to develop according to the laws of growth inherent to them. Such a stereotyped regimentation results in the produc-

tion of not the normal individual but the grotesque. Hence this secular religion does not attract men.

Specially after the recent foreign policy of Russia, serious minded students of politics have become sceptical about communism. This political faith is no longer the channel for catching waters of youthful idealism. "Communism is now only a convention and is no longer a revelation, it is a fashion to be followed rather than a truth to be fought for."[3]

The grave historical times in which we live encourage only secularism and a short term view of life. It does not help to believe in any religion. As Prof. Joad puts it, our age is an age of demolition. There are no secure jobs for the young needing their services. The fear of unemployment and the uncertainty of the future promote only a short term view of life. Hence the modern young men are derisive of both heavenly rewards and infernal punishments. Freudian psychology has given an academic backing to it and has made license respectable. Hence the admonition to control ourselves is besides the point.

In the midst of such a distracted world besides communism we find another false religion, in the garb of efficient Totalitarian powers crushing the whole world under the military jack-boot. The advance of scientific materialism and the corruption of the churches have undermined the faith of the average individual in religion. This impression of the faith in the divine gave rise to surprising outlets. The human need to believe can never be eradicated. Man cannot put up with a spiritual vacuum. There is a persistent cry in man for a god. If he cannot find a God in heaven, he must fall down before a god on earth. That God on earth, turns out to be a Hitler or Mussolini or Stalin. Hence Fascism is a distorted version of man's need for a religion.[4]

Dogmatism is another enemy of genuine religion, itself masqerading as a religion. The dogmatists deny as categorically as the Naturalist the existence of mystery at the heart of the universe. They talk as if they know all about the Maker and as men who assisted god in the construction of hell and heaven. To the dogmatist religion is found between the two covers of the sacred books as interpreted by the prophets. Dogmatism institutionalises reli-

3. See Prof. Joad's "Philosophy for our Times," Chapter I.
4. Cf. Prof. Joad's Chapter on *Fascism* in his book on the *Philosophy of Morals and Politics*.

gion and stands for a rigid code of doctrines and regular round of rituals. They spent most of their time in discussing theological dogmas exhibiting their infinite capacity for making obscure details verbally clear. They have their definite conceptions of god, with qualities more powerful than those of human beings. The God of one religion is Satan to the other religionists. It is in the name of these rival gods that most of the religious wars in Europe have been fought. The evils of an 'affirmative theology' are many. The least of them all is fanaticism. These fundamentalists mistake the existing social institutions to be ordained by God and hence unalterable. They uphold the *status quo*.

We have so far examined the nature of false religions that have attacked the true spiritual religion which has been attested to by a long line of mystics of different countries and climes. There are some who ask us not to fly in the face of facts and argue away the determinist element in the universe. They ask us in the spirit of the humanists to take the arts and literature as substitutes for religion. They say that the satisfaction we need can be achieved in the world of art and poetry. Many a savant of humanity has put forth this suggestion that art and poetry are enough for man. But it can hardly take the place of religion. In the words of a learned professor of literature, poetry revels in the antinomies of emotion, while religion tries to transcend them.[5] Poetry lives and moves and has its being amidst the many, while religion ascends to the one. Therefore, as an English mystic poet has said, poetry cannot save the soul, but makes it worth saving. Poetry enriches the treasures of the heart of man and religion offers them at the feet of God. Poetry at best can be a portal to prayer.

Genuine religion is not against the fundamentals of science.[6] It has the sanctions of religion. Men like Eddington, Jeans and Whitehead have proved that science is not incompatible with spiritual life. Religion in the words of Aldous Huxley is a system of education by means of which human beings may train themselves, first to make desirable changes in their own personalities and, at one remove, in society, and, in the second place, to heighten consciousness and so establish more adequate relations between themselves and the universe of which they are parts. The essence of religion is experience. It is spiritual experience. Spiri-

5. See Prof. D. S. Sarma's article on 'Poetry and Religion', p. 10. *How It Strikes a Hindu.*

6. See author's article on 'Science and Reality,' *Journal of Oriental Research,* Vol. XIV, part 1.

tualtity, in the words of Radhakrishnan, is the core of religion, and mysticism emphasises this aspect of religion.[7] Religion is integral experience. To the spiritual aspirant God is not a logical factor, but a real experience. The reality of spiritual experience remains unaffected by the advance of a science and criticism of history. The spiritual experience knows no limit. It is not confined to any distinct view of life. It is the eternal need of man. No revelation is final in the history of the spirit. It is a progressive experience. The men of religious experience breathe the spirit of religion. The content of spiritual experience is hyperphysical and supersensuous. It is what is beyond the scientist's ken and his measuring rods. Science did not and still does not possess intellectual instruments with which to deal with those aspects of reality, i.e., the experience of mystic ecstacy, the intimations of Godhead. The mere fact that there is a growing indifference to organised religion is no guarantee that religion has lost its hold on the minds of men. Mysticism which is the core of religion is opposed to Naturalism as well as to dogmatism.[8] Both agree in driving away the mystery from the factor of *Mysterium Tremendum*. Religion is a personal experience of God, immediate and direct. "It is the concurrent activity of thought feeling and will. It satisfies the logical demand for abiding certainty, the aesthetic longing for repose and the ethical desire for perfection." This experience is called by various names, fellowship with God, Brahman-realisation etc. Such experience transforms the apparent individuality of the finite self. It is not mere imagination, because the object of its experience is *bona fide*. To the mystic, God is as much a fact as the leaf is to the botanist. The Upaniṣads declare that there is nothing superior to the puruṣa.[9] Hence to the man of religion man cannot be dissolved into a few pounds of carbon and a few quarts of water. Man is not body plus a mind, but is essentially spirit. The great mystics of the world have realised this experience and have set down in verse and prose their experiences. The characteristics of religious experience can be set down

7. A. C. Bradley's *Ideals of Religion*. "In the end there must be mystery for us; the claim to possess the whole truth, to know what God is as God Himself knows it, is that blasphemy of the abstract mind against which we have to be constantly on the guard."

8. "Intolerance is irreligion" M. K. Gandhi.
Over the door of Śāntiniketan, the home of the Tagores, runs the following incription, "In this place no image is to be adored and no man's faith is to be despised."

9. Kaṭha Upaniṣad, I, 3, 11.

as follows: It is not clearly differentiated into a subject object relation, it is integral and undivided. It represents the entire being of men. It is self-sufficient and complete. It is self-established (svatassiddha) self-evidencing (svasamvedya) and self-luminous (svayam-prakāśa). It is described by Radhakrishnan as follows: It is pure comprehension, entire significance, and complete validity. The mind sees, the will consents and soul approves. When the individual withdraws his soul from all outward events, gathers himself together inwardly, and strives with concentration, there breaks upon him an experience secret, strange and wondrous which quickens within him, lays hold on him and becomes his very being.

It is this kind of genuine religious experience that can be called spiritual. The world has not suffered because of religion, but because of the want of a proper religion. No man of genuine religious experience will fail to reconstruct society on the basis of love and justice. Before any great change is effected the individual must be reformed. Political adjustments and economic schemes would prove of very little use, if the individual were not to change. The new social order must be built on the moral regeneration of men. No moral regeneration of men is possible without a religious experience. Some may hold that they are not able to experience the religious feeling. This is no argument against religion. Aldous Huxley has a clever answer to these doubting Thomases. Of the significant and pleasurable experiences of life only the simplest are open indiscriminately to all. The rest cannot be had except to those who have undergone a suitable training. One must be trained to enjoy the pleasures of alcohol and tobacco; first whiskies seem revolting, the first pipe turns even the strongest of boyish stomachs —the first differential equation is a sheer torture.[10] So from this it follows that we must prepare ourselves for the religious experience, by leading a very moral life; ethical excellence is a necessary step for God realisation. In the words of St. John of the Cross we must empty our soul of greed, ambition and other worldly desires before we receive the grace of God. There is a necessity for a preparedness of the soul. "Religion is like the string of a violin; if removed from its resonant body it will give the wrong tune."

From the above enquiry it follows that religion which is based on spiritual experience, far from being a hindrance to society, is a source of great help. Every religion from Paganism to Vedānta has contributed to the well being of men. What we need is not a change of religion but a vitalising of the one in which we are.

10. Huxley's *Ends and Means*, p. 286-288.

REVIEWS.

OXFORD PAMPHLETS ON WORLD AFFAIRS

The Clarendon Press is doing a real service by the issue of the excellent series of Oxford pamphlets on world affairs, pamphlets at once instructive and provocative of thought, as may be expected from the eminence of the contributors. Written primarily from the English standpoint and meant chiefly for the instruction of the English people, they easily take a place for above that of mere propaganda literature. The information furnished in each topic is fairly full and accurate, and the comment is nowhere unduly biassed. This series of little books is altogether a welcome aid to the understanding of the issues relating to the war, or rather the wars, now being waged in different parts of Europe and Africa.

The first of the pamphlets is an attempt by Sir Alfred Zimmern to judge the *'Prospects of Civilisation'*. Deprecating alike the optimism of 1919 and the pessimism of 1939, he distinguishes three aspects of the problem before us, the immediate political problem involved in the conflict with totalitarianism, the long-distance problem of sound economic distribution and internationalism and the permanent ethical problem due to the tension between moral ideals and political realities. The permanent problem has been intensified partly because the sphere of political realities to be considered has become vaster and partly because our own moral standards have become largely unsettled. The sanction of punishment, here or hereafter, has given place to the sanction of defeat. In the nature of things there can be no complete solution, since the ethical problem necessarily implies tension; there is, however, the possibility of improving on the present state of affairs and finding a *via media* between "doctrinaire rigidity and a pliable opportunism." The long-distance problem of due economic distribution will admit of solution if we do not demand too much; it is no good trying to thrust a fully fledged scheme of internationalism down the throat of the ordinary man; it will be enough if we can educate him to be world-minded for *some* of his time instead of demanding he should be world-minded *all* the time; we should get on with the least possible change instead of attempting the greatest possible change; for with the discrediting of the 'inheritance of acquired characters' we have to reckon with the biological fact, that the man we have to

deal with continues essentially small-scale, while the world he has to respond to has become large-scale. The solutions of the major problems not being too hopeful, it is no surprise to see that the author is not very convincing in his treatment of the political problem. Totalitarianism is a false god, a Moloch, with whom there can be no parleying; it is an atavistic frenzy to be resisted at all costs; this political immaturity or aberration is not sought to be explained, though it is realised that 'until that chronic condition has yielded to treatment, the progress of international co-operation will be delayed." Sir Alfred's treatment is meant to be clear and is certainly honest; but in his own phraseology it only brings home to us the conviction what small-scale men we are and what a large-scale problem we are up against.

Mr. H. V. Hodson, Editor, of the "Round Table," explains and defines the status and the relationship between the various members of the British Commonwealth of Nations. He describes the machinery of the "*British Empire*" touching matters such as Dominion Neutrality in war time, co-ordination for defence, trade relations, and migration.

E.A.

Mr. R. C. K. Ensor, Fellow of Corpus Christie, Oxford, is the author of more than one pamphlet in this series. The first of these relates to '*Mein Kampf*' and Herr Hitler's self-disclosure therein. "Ill-arranged and confusing as it is *Mein Kampf* by no means lacks logic." Frankness is another outstanding feature; while Hitler consistently gulls gullible humanity, he makes no secret of that policy, but parades it in the book. The leading idea is the apotheosis of the Aryan race, the race that has made the only notable contributions to civilisation, though repeatedly its edifices have collapsed because of miscegenation. The Germans and the British to a great extent represent this Nordic race; other races have either to be subjugated like the Slavs or exterminated like the Jews. This race-dogma flourished on the Post-War German soil since apart from the inferiority complex of a defeated nation seeking some compensatory solace, Germans unlike the French, British or Americans were not till recently knit together as a *nation.* The other leading idea is *Lebensraum;* a growing country requires room for expansion unless it urbanises itself, depends on export which is at the mercy of countless foreign vicissitudes and continues as a compact unit, vulnera-

ble in war; expansion must be achieved with the sword and consolidated with the plough; the future great Germany is to be essentially rural, and this has to be made possible by extensive expansion (especially in the East) and a remorseless pursuit of the policy "might is right." If this had been realised by the Western powers, they would not have been as complaisant as they were down to jettisoning Czecho-Slovakia. Hitler's only touchstone for word or deed is success; yet with this cynicism goes a queer idealism, advocating effort, duty and self-sacrifice; and his call has not fallen on deaf ears. He has shown what a lone man of spirit with a single blackthorn can do against nerveless adversaries each with ten pistols. Is it too late for the others to act ? They have certainly got on to the carefully prepared morass ; whether they can get out—that is prediction or propaganda ; and neither interests Mr. Ensor who has given us this excellent picture of Hitler, the man and the book.

Julian Huxley had declared himself in no uncertain terms even before this war, against the race-fad. He returns to the theme in *'Race' in Europe.* The word 'race' has no fixed meaning as will be seen on consulting any respectable dictionary. Applied to human beings it is a myth and a dangerous one at that. Even in such relatively small groups like the Scottish or Irish clans kinship could be acquired and even bought without dependence on a mysterious blood-thicker-than-water. An enthusiastic philologist in a moment of weakness spoke of an Aryan race, when the unity of an Aryan tongue was all that he needed; and in spite of the confession of his mistake, the evil he did continued to flourish and lift its monstrous head under the championship of Hitler. Where races or types can be distinguished, no one type can claim exclusive superiority; the Mediterranean type has contributed at least as much to civilisation as the Nordic; and the mixture of types has been beneficial rather than the reverse. "Goethe, Beethoven and Kant were medium or round-headed, not long-headed—Napoleon, Shakespeare, Einstein, Galileo—a dozen great names spring to mind which in themselves should be enough to disperse the Nordic myth" this pagan god (in the words of R. G. Collingwood) deified as a cloak for aggressively selfish economic aims.

The Fourteen Points and the Treaty of Versailles examines the Treaty of Versailles with a view to determine how far the treaty violated the Fourteen Points, and how

far such violation may be said to have brought about the aggressions of Nazi Germany. It is argued that the Fourteen Points were vague in their contents, that some of them had been repudiated or accepted only in a modified form by the allies in the pre-armistice agreement, that only a few of them had a direct bearing on Germany's position and these were interpreted as fairly as possible, and that in any event Germany was treated more considerately than she could have hoped for in the circumstances. In the course of the argument, it is admitted that over the war guilt clause, reparations, colonies, the Saar mines and so on, Germany was irritated and was provided with first class propaganda material. For all its defects, says Mr. G. M. Gathorne, citing Dr. Seton Watson, the treaty was 'the first international settlement which its authors deliberately tried to erect upon definite ethical principles.' But the measure of success attained in this endeavour has not been great; and ethics and politics still stand as far apart as ever.

K.A.N.

R. R. Kuczynski: *"Living Space" and Population Problems*, 31 pp. This interesting pamphlet discusses the problem of "Lebensraum." The author had described in some detail the population positions and policies of the two most outstanding totalitarian States of to-day, Germany and Italy. With special reference to Germany, he has also discussed the economic potentialities of her former colonies and has suggested that her present economic position without those colonies is more valuable than with them before the War of 1914-18, because she is now more self-sufficient than before in foodstuffs and even in raw materials. Nor does Germany want, he says, colonies to relieve her from the pressure of population. On the other hand, she wants and deliberately encourages an increase in the number of her hands. Therefore the German slogan of "Lebensraum", says Dr. Kuczynski, has little meaning.

P.J.T.

Mr. G. F. Hudson, gives in this small booklet *"Turkey, Greece and the Eastern Mediterranean,* (1939)" a brief analysis of the relations since the beginning of the present century between the three Mediterranean Powers, Italy, Greece and Turkey, influenced now and again by the attitude of the Great European powers, Britain, France and Russia. Turkey formed the main object of the attention of Italy and Greece which made successive attempts to occupy

Turkish possessions in the Eastern Mediterranean as well as in the mainland of Asia Minor, particularly the island-group, the Dodecanese and the two big islands of Chios and Mytelene which have since become Italian and Greek possessions respectively. The proposals for the partition of Turkey between Greece Italy and France during the last war and the actual occupation of Symrna by Greece are described at length. The rise of Kemal Pasha Ataturk to power (1920) and the consolidation of the Turkish nation under him with active support from Soviet Russia forms the most interesting episode of post-War Turkish History. The booklet closes with the narration of the circumstances under which Greece and Turkey, the erstwhile enemies, have now become mutual friends under the threat of Fascist Italy's imperialistic ambitions. The two maps (1) showing the division of Turkey according to the secret treaties of 1915-17 and the treaties of 1920 and (2) showing the position and strategic importance of the Italian possessions in the Eastern Mediterranean are helpful.

N.V.R.

In the pamphlet "*The Danube Basin,*" Mr. C. A. Macartney gives in clear outline the problems relating to the different nationalities tlfat live in the Danube Basin, viz., the Balkan States. The principle of self-determination applied to these states subsequent to the last war failed to bear fruit owing to the fact that these nationalities had 'no stable institutions and historic independence which crystallise the consciousness of the nationality'. The different races that live in the Balkans viz., the Czechs, the Slovaks, Serbs, Croats, Slovenes, the Magyars, the Ruthenes and the Austrians have racial boundaries that run counter to the geographical factors. A detailed account of the activities of the neighbouring bigger states of Italy, Russia and Germany in the Balkan states, the Post-War settlement of these states, the influence and the part played by the League of Nations in the Balkan affairs, and finally the rise of Nazi Germany and the problems created by its philosophy of Lebensraum are all discussed in the pamphlet at some length. On the inside of its two outer covers there are two maps of the Danubian states and central Europe to guide the reader.

N.V.R.

In the *Dual Policy,* Sir Arthur Salter discusses the policy pursued by the British Government since March 1939—resistance to force, and the building of peace. The Federal Union scheme for

world peace was perhaps initiated just too late. In this Pamphlet Sir Arthur suggests another scheme—that the British Government should work out in detail a constructive peace plan, which should take into account the Versailles Treaty, 'encirclement,' Lebensraum, economic opportunity, colonies, etc. and publish it as a State Paper circulated among the governments of the world. "A broadly conceived and magnanimous, constructive peace policy, presented as a White Paper....might transform the whole international situation."

E. A.

Propaganda is the most recent instrument of Foreign Policy, and plays so important a part in international affairs that some idea of its origin, character and function is essential to-day. The Communists were pioneers in this direction, but it was during the Great War that its effect was clearly revealed, for few will deny that the Great War was won by a combination of military power, economic power and propaganda. With the establishment of the Ministry of Popular Englightenment in Germany, the Ministry of Popular Culture in Italy and the Foreign Publicity Department of the Foreign Office in Britain, propaganda was established as a peace-time policy. Professor E. H. Carr has some interesting points to make concerning *Propaganda in International Politics*. As an instrument of foreign policy it cannot be dissociated from political power—it cannot be international, and to achieve its maximum effect it must be as near the truth as possible and have some moral sanction or appeal.

E.A.

In '*Encirclement*' Brierly shows that this cry was first started by Bülow to overcome the resistance to successive expansions of the German navy. The element of truth in the charge in recent years, especially since March 1939, is allowed, but it is rightly pointed out that the geographical position of the Axis powers enabled them to carry out some successive exercises in this game against their opponents, and that retaliation became a necessity for those that were threatened.

K.A.N.

Vice-President of the Refugee Settlement Commission in Athens from 1926 to 1930, Sir John Hope Simpson is best fitted to tackle

the "*Refugee Problem*" which is assuming more and more serious proportions with the growth of a false sense of nationalism and the consequent racial persecution. The magnitude of the problem is still more enhanced by the frequent outbreaks of wars in general. It has almost developed to an extent at which it is impossible for individual charity to face the question squarely. The problem is becoming increasingly political. The Evian Committee and the Inter-governmental Committee have to some extent mitigated the rigour. But the final solution is still to be settled. The author suggests future possibilities for a radical solution.

V.R.R.

Brest-Litovsk is a study in the contrast between the circumstances under which Germans met the Russians in Conference in this city on two occasions—once in March 1918 and again in September 1939. On the first occasion European Russia was dismembered by a victorious Germany; ' she was cut off from the Black Sea and very nearly from the Baltic also.' Then Germany achieved some unintended results too; she furnished fair warning of what her foes had to expect if they lost the war; she helped to save the Russian Revolution, and prepare the Revolution at home; lastly by rousing fears of possible German penetration in Asiatic Russia, she indirectly enabled Japan to send her troops into Siberia where they remained till 1922, an important stage in the development of Japanese policy in Eastern Asia. Twenty-one years later, Russia had the whip hand. Hitler was the supplicant desperately anxious to win over Stalin to his side, and Stalin eager to pay off 'the rebuff of Munich'. The 'speed and depth' of Soviet advance to-day is a source of surprise and anxiety to Hitler himself, and 1939 has achieved much more than merely recover the ground lost in 1918. The end of the second "Brest-Litovsk" is not yet; 'for it is but a short step from National Socialism to National Bolshevism'.

K.A.N.

Czechoslovakia by R. Birley is an outline of the history of the Czech people and their culture from their entry into the Bohemian plain in the sixth century A.D. In the ninth century Bohemia formed part of the Moravian kingdom Svatopluk. With the conversion of the Czechs from Constantinople the turn of history cut them off from the East. The break up of Svatopluk's kingdom in 894 created Bohemia. Situated in the midst of Teutonic

lands, it began to be affected by German influence. The next great figure in Bohemian history was Charles who became Holy Roman emperor in 1346, who was responsible for founding the University of Prague in 1348. In course of time Bohemia got united with Hungary. Religious wars led the Czechs to embrace again Catholicism and to become part of a Jesuit culture. Prague University was handed over to the Jesuits in 1623. From this time the development of Czech culture was arrested. In the latter half of the 18th century German became the official language of the country. The 19th century witnessed the revival of the Czechs, an artistic revival. After the war of 1914-18 the Republic of Czchoslovakia was created. But its essential problem was foreign policy. In 1938 Germany demanded security of the German minority and in March 1939 its western portion was occupied by the Germans and made a province of the Reich. Slovakia became a German protectorate and Ruthenia was annexed by Hungary.

V. R. R.

W. Arnold Forster's *The Blockade*—1914-19 deals with the various measures taken by the Allied Powers during the last war to blockade Germany and their working during the war. Mr. Arnold Forster has shown that considerable quantities of food were sent into Germany before peace was signed, despite a widespread but erroneous belief to the contrary.

P.J.T.

The cult of Blood, Race and Soil cannot but come into clash with the Churches, whether Protestant or Christian, except in extreme cases like that of the "German Christians" who have adopted wholesale the Nazi formula. The story of this conflict, of the Aryanising of Christ who waged war against the Jews, of the exaltation of 'honour' in contrast with the traditional Christian virtues (Nietzsche called them slave-morality) of meekness, self-sacrifice, etc., of the concordats made only to be violated since they were so blatantly at variance with the Nazi *Weltanschauung*, of the persecutions and calumnies and of the present unhappy positions of both churches, this is graphically told by Principal Micklem of Mansfield College in *National Socialism and Christianity*. The only comment one would like to make is this. It may be that the church cannot leave politics alone if it desires to keep in touch with its flock and mundane affairs. It behoves it then to be ultracautious

in its judgments, to be more sober than the most critical of the laity, and to avoid rushing to a real Scylla in avoiding a (possibly imaginary) Charybdis. Yet the Roman Catholic church at least would appear to have failed signally in the exercise of such caution. Who does not know the sympathy of the Catholic clergy with the intervention of the axis-powers in Spain, all because of the Bolshevik persecution of religion? Which was the greater danger, the irreligion of the Bolshevik or the heathenism of the Nazi?

Mr. Ensor's account of Hitler's ideas cannot be complete without a picture of his personality and a sketch of his career. This Mr. Ensor provides in *Who Hitler Is.* The phenomenal rise of a man from lance-corporal at 30 to Chancellor at 45, the rise of the influence of a party from 12 seats in 1928 to 107 seats in 1930, these are the main themes of the pamphlet. The details of the rise are best told in Mr. Ensor's own words; but the story offers repeated justification of Hitler's guiding principle "Nothing succeeds like success". Throughout Hitler has stuck to his fundamental ideas and realised them ever ruthlessly—the extirpation of the Jews, the re-armament of Germany in bold defiance of the Allied Powers, the unification of the German people and the expansion of Germany towards the East. His alliance with Russia is a breach with his original beliefs. Does that spell misfortune? Or is it a "lucky break" like the earlier abandonment of cranky economic ideas, when he became Führer of the Nation ?

The sanctity of law and the independence of the judiciary are cardinal principles of any sound constitution. Yet they are among the first to be sacrificed with the coming to power of persons or parties who have long suffered under an inferiority complex. This process of deterioration which culminates in a judiciary that is a creature of the Executive and a law that is the deliverance of a Dictator, is clearly sketched in the case of Germany by J. Walter Jones, under the title *The Nazi Conception of Law.* Even prior to 1939, the leadership principle and the racial principle had been accepted by the Nazis. The leader is the true representative of the people; his is authoritarian, not atomistic, democracy, but it is real democracy all the same. The State is indissolubly bound up with law; it is indeed a *Rechtstaat;* it is not, however, bound by statutes which after all form only a minor part of the law; the non-statutory part of the will depends neither on the codes of minor corporations

within the state nor on the interpretations and decisions of judges, but on the decision of the leader. That is where we have the travesty of a notion of law, sound at the core, indeed sounder than the ancient Austinian conception; the latter was despotic in form, not in application; the former was essentially democratic in form, but has turned out despotic in application. And the travesty is more intense when it is insisted that the people whose spirit the law is taken to represent should be a homogenous unit, and belong to one race, the Aryan race for preference. As practical consequences of the reaction against non-Aryan, i.e., Roman law, private ownership and even possession are discountenanced, contracts are easily flouted on the ground of unilateral declarations of impossibility of performance, judicial interpretation of contracts has become over-free, and there is aversion to arbitration. The attitude to the criminal within the State is as ruthless as towards a foreign foe. If the court can find no statute under which to convict, it should still do so, according to sound popular sentiment. The fate of International Law for such an attitude needs little elaboration.

Mr. J. N. L. Baker has prepared a very useful *Atlas of the War*, with fifteen maps and some explanatory notes. Of the maps, that of the Western Front (No. 12) has become out of date. The notes are calculated not only to inform the reader but also guide his thinking.

Sir W. Beveridge's *Blockade and the Civilian Population* examines the probable effects of the Allied Blockade on the civilian population of Germany, and gives a short but thoroughgoing analysis of the relationship between armaments and foodstuffs on the one hand and of Germany's food position and supplies on the other. It also presents Field-Marshal Goering's alternative of "guns or butter" as a remarkably true statement of the actual position of Germany in this respect. The analysis is entirely factual and hence convincing. And he has well brought out the need for preventing fats for Germany—which she most needs also—as an essential war measure, because fats are directly convertible into armaments, though not identical with them. On the whole, Sir William Beveridge has written a valuable Pamphlet making out in a clear and analytical way an important and constructive point in the successful working of the economic warfare against Germany.

P.J.T.

In *The Naval Role in Modern Warfare* Admiral Sir Herbert Richmond gives an admirable study of a very important subject. The author who is an authority on naval matters prefaces his study with Rules of war such as have been generally accepted by the civilised nations barring Germany. He quotes the German war book according to which no obligation need be binding when its observance stands in the way of military or political success. He traces the changes that have taken place since the last war, particularly phenomenal increase in air arm. He goes on to discuss the three measures of trade defence—cruising, convoy and depriving commerce raiders of supplies. After examining the position of Neutrals and supply ships, he points out the misuse of submarines and mines by the enemy setting at naught all international agreements. Those who want to know the fundamental principles of British naval strategy to-day will be amply profited by a perusal of this pamphlet.

V.R.R.

J. H. Jackson succinctly explains in *The Baltic* the Teutonic and mediaeval origins of Baltic nationalism, the failure of attempts to Russianise the Balts, and the emergence of independent Baltic states of Finland, Esthonia, Latvia and Lithuania from the Great War. 'The period between 1920 and 1935 was a golden age in the Baltic'. And when troubles leading to the present war began, Russia made it a condition of her joining in the guarantee to Poland that the Baltic States must be included in it, but the Baltic Sates 'not unnaturally preferred the risk of German aggression to the certainty of Soviet military occupation'. But they gained thus only a short reprieve; and 'the shape of things to come is anything but clear'.

K.A.N.

In *Britain's Air Power* Mr. E. Colston Shepherd deals with some special problems of Britain's Air Force and with the organisation of the R. A. F. In the last war the aeroplane was mainly the reconnaisance aeroplane and was deemed by both Navy and Army as a valuable scout to bring in information of enemy movements. But to-day its functions have been widened. We have twenty different types of aeroplanes. Among them the chief are fighters, bombers and reconnaisance aeroplanes. The fighter is for defence against enemy aircraft while the bomber

attacks enemy objectives. The British bombers are splendidly armed and generally fly in formation. In the last few weeks the work of the British fighters and bombers is something marvellous and shows the high efficiency of the service which is backed by the great supply organisation of the Air Ministry and the Aircraft Industry. With the willing co-operation of the Dominions the Air arm of Britain is growing day by day and inspires full confidence in all lovers of democracy.

V.R.R.

Dr. J. A. Williamson, unlike Mr. Hodson, is more historical in his treatment of the *Life and Growth of the British Empire*. He answers Herr Hitler's charge that forty four million Englishmen own more than a quarter of the world's territory—with the implication that the world cries out for justice. It is difficult to say in so small a compass all that should be said, but Dr. Williamson's reply is liberal and convincing.

E.A.

Max Nicholson's *How Britain's Resources are mobilized* deals with the efforts made, especially the State controls set up, in Britain for the purpose of conducting the war. It explains in a nutshell the entire machinery of administrative control during war time. Each of the five forces—Navy, Army, Air Force, Economic Warfare, Propaganda—has its own department namely, the Admirality, War Office, Air Ministry, Ministry of Economic Warfare and Ministry of Information. A sixth department, the Ministry of Home Security, is the latest addition. The author also deals with the six big economic departments, concerned with economic mobilization, namely the Treasury, the Ministries of Supply, Food, Shipping, Labour and National Service. The whole of this war machinery is described in a clear and concise manner.

P.J.T.

Mr. Percival Spear reviewing the question of *Communal Harmony* in India offers what he considers an equitable solution, based on the distinction of political from cultural activities and the devising of suitable guilds for the conduct of the latter without conflict. Thus will be solved India's supreme problem of how "to combine unity with variety." The guilds would have both administra-

tive and legislative authority; they could effectively legislate about matters of personal and private law; there would be no longer Muslim votes determining the form of a Hindu valid marriage. No doubt this may mean an initial strengthening of the conservative forces; but even this will make way for progress. There will be both provincial and national guilds; the latter will deal with measures like the Sarda Act affecting the whole of any community. Communities as such may and should find representation in second chambers, wherein any community could veto a proposal if but it be unanimous. Where there is clash between guild and government the Federal Court may decide. Mr. Spear has also some interesting suggestions to make about such vexed problems as the Army, the Central Executive, Patronage and so on. And his scheme as a whole looks rather good on paper at the first blush. The trouble will start in effecting a demarcation between the political and the cultural. Where does education belong? Obviously it must be controlled by the guilds; and equally obviously, it should be managed by a central body which will not encourage communalism and conflict, as the guilds are likely to. Mr. Spear casually speaks of two guilds, one for the Brahmins and the other for the non-Brahmins in the South. Will one guild suffice for the latter? And will the non-Brahmins ever agree to equality of political representation for the Brahmin guild? Again, a measure like the Sarda Act is concerned not with religious prejudices alone but also with national health. Is such a matter to be decided by the general legislature or by the guild? If particular guilds are recalcitrant or unduly conservative what is the remedy where the issue is national ? Altogether, Mr. Spear's suggestion raises at least as many problems as it solves; and the last word on communal harmony has not yet been said.

The Foreign Secretary, Viscount Halifax, is also the Chancellor of Oxford University and in this dual personality delivered an address on *The Challenge to Liberty*. His Lordship develops the contrast between the present war and the last great war; in the latter there was a feeling that the old men and the politicians went to war, sacrificing the youth of all countries; now it is a conflict of youth with youth, since the vicious ideology that has proved the struggle has permeated the entire nation and warped its outlook. The present pass is not due merely to "the mistakes, the pride and the selfishness of an older generation." The moral retrogression in Europe is astonishing particularly the "devastating perversion

of youth in Germany. There is no choice but to resist and defeat by force the attack to which those [non-Nazi] ideals....are now exposed." That way may be established a better, though perhaps not an easier world. There is reason to be hopeful about the future despite disillusions about the past; we are sure of the goal and the way; for in spite of the professions of "men of high principle" the noble Lord holds that when "evil spirits invoke force for the prosecution of their purpose, and the struggle is thus joined in the physical arena, it is only by force on the battle-ground thus chosen that the evil can be resisted." This will no doubt convince most readers as it must have convinced most if not all the listeners.

In this little book *Labour under Nazi rule* Mr. William A. Robson deals with the important changes that have lately taken place in the position of labour under Nazi rule. A machinery has developed for the regimentation of labour: the Confidential Council, the Labour Trustees, the Social Honour Courts etc. No doubt the Nazis have considerably reduced unemployment, but at a high cost to the labourer's position and happiness. Mr. Robson shows that the industrial control in a free country like Britain even in war time is bliss when compared to the enslavement of labour under Nazi rule.

P.J.T.

The role of Russia in the present tangle is very clearly set forth by Miss Barbara Ward in *Russian Foreign Policy*. Promotion of the Communist Revolution and her own security have been the dominant and alternating aims of Russian policy. When the world declined to respond to the revolutionary appeal, Russia under Stalin, has entered upon the relentless pursuit of security. After Versailles, Russia's need for German technical help and Germany's need for Russia as the practising ground of military arts forbidden on her own territory brought them together. The rise of Hitler and his anticomintern policy brought on a change, and Russia joined the League and befriended the democracies. But the ruling classes of England and France had not yet recognised Fascism in its true colours, and deeply hated Communism, witness Spain and Munich. Russia stands alone and pursues her own security; she will not take sides in any decisive manner, but take all possible advantage of the preoccupations of other powers, and still hope for the spread of

Communism in Europe as the effect of War and privation. But what her policy 'will bring, not even Russia knows.'

K.A.N.

The Nazis have persistently spread the report that Germany did not suffer a military defeat in 1918, but was weakened by the blockade and betrayed by traitors. This contention is met, with not a little ability by Captain Cyril Falls in *Was Germany Defeated in* 1918? The author tries to show how the German military and naval situation had become untenable by the beginning of November 1918. He himself has to recognise the naval mutiny at Kiel and the possible spread of Bolshevist influences; he holds also that "To reach the kernel of reality we may, however, disregard to a great extent academic discussions of why and wherefore. In a modern authoritarian state revolution may be considered to be the inevitable accompaniment of defeat; one may almost say that revolution and defeat are one." In the light of such statements one wonders whether the dividing line is not rather thin between what the Nazi claims and the Anti-Nazis prove. The narration of events, however, is masterly and will certainly interest readers not familiar with the entire ground.

ANANDARANGA PILLAI; THE 'PEPYS' OF FRENCH INDIA. By Rao Saheb C. S. Srinivasachari, M.A., Professor of History and Politics, Annamalai University.

This valuable book is a welcome addition to the rather sparse literature concerning the doings of the French in India and their attempts to establish an empire in Hindustan. The learned author, who is a Professor of repute, a scientific scholar and historian who is so well-known to the students of British Indian History has prepared a most useful and well-written history of the period of French connection with India basing his narrative upon the entries in the Diary maintained by Ananda Ranga Pillai, a *courtier* under Dupleix and a big merchant of Pondicherry, who richly deserves to be called the 'Pepys' of French India as his observations on the general conditions of his time bearing upon all aspects of life, political social and religious are on a par with and even more valuable on the political side than those of Pepys on the social life of the age of Charles II of England.

The value of the Diary lies in its being the most reliable record of the day to day happenings in the Carnatic and the Deccan in the

middle of the 18th century A.D. The period required such a diarist to chronicle the events of far reaching importance which took place in such quick succession reflecting the unsettled character of the governments of the day. The Diary extended from 1736 to 1760 with lacunae in a few places covering short periods. It may be hoped that these lacunae will be filled up on an examination of the transcript of the Diary preserved in France which, thanks to the efforts of the savant Prof. G. J. Dubreuil, has been brought to light.

In presenting the historical matter contained in the Diary in the present form, the author has adopted a plan which is characteristic of a sound historical production based upon scientific research. While the entries in the Diary are woven into a continuous narrative, in the body of the book, the author has in his own long and scholarly footnotes, amplified many observations of the Diarist so that the future scholar who handles the book can assess accurately the contributions made by Ananda Ranga Pillai to the history of the period, deriving much benefit from the author's study and research embodied in the notes.

In the introductory chapter Prof. Srinivasachari gives a detailed account of the discovery of the Diary revealing several facts not known hitherto.

The period covered by the Diary (1736-1760) is one of the most momentous periods of South Indian history during which the French under Dupleix, whose *courtier* Ananda Ranga Pillai was, tried to establish an empire in India and to this end involved themselves in the affairs of the local princes and potentates, chiefly the Nizam and his subordinate Nawabs of Arcot, Cuddapah and Kurnool, the Maharattas and the rulers of Mysore, Tanjore and and Trichinopoly. They came into conflict with the English, who, although solely interested in trade and commerce in which they were competitors with all other European powers who were then trading in the East, were however drawn into the whirlpool of politics and political strife.

This triangular contest among the native powers, the French, and the English, forms the subject matter of this book which runs into twenty chapters. The first four chapters contain an account of Dupleix's successful attempts to capture Madras from the English in which he had to employ the services of an unruly subordinate La Bourdonnais, the Commander of the fleet. The Diarist's observations on the quarrel between the two officers are enlightening. The subsequent chapters upto chapter XIII describe the two civil wars, the one in the Carnatic between Chandā Sahib

and Anwaruḍḍin and his son Muhammad Ali, and the other at Hyderabad between Nazir Jung and Muzaffar Jung in which the French and the English supported the opposing claimants so that the struggle that developed later was transformed into an Anglo-French duel for supremacy in South India. These events though familiar to the student of British Indian History are however described in the book in an illuminating manner with great wealth of detail and with copious footnotes of which those on the contemporary Mahratta history (pp. 155-6) the site of Nazir Jung's murder (pp. 190-2) and on the 72 Pāḷaigars of South India (p. 201-5) are among the most interesting. Chapters XIV and XV relate to the governorships of Godeheu and De Syrit under whom the Diarist received scant respect and regard in contrast to the high dignity and honour which be commanded under Dupleix. The last few Chapters trace the concluding phase of the French struggle for power, the successes and failures that attended Bussy in the Deccan in his relations with the Nizam and the Mahrattas, the brief spell of power he enjoyed at Vizianagaram, Bobbili and the Sarcars, and the final collapse of the French under Lally.

There is at the beginning of the book a photograph of the Diarist taken from an oil painting. A map, an exhaustive bibliography, and an analytical index at the end enhance the usefulness of the book.

N.V.R.

THE EARLY HISTORY OF CEYLON. By G. C. Mendis, Ph. D. (The Heritage of Ceylon Series). Y.M.C.A. Publishing House, Calcutta (1940). Fourth Edition—revised and enlarged. Price Rs. 2.

This is the fourth edition of the book in a revised form. There are five chapters, the first of which deals with the early settlers and the introduction of Buddhism. This chapter begins with the life and traditions of the Vaddas, the primitive tribes of Ceylon. It is said that the Aryan immigrants were the first to introduce the system of village government, *Gaṇasabha* which persists to the present day. That the Dravidians too helped to form the Sinhalese race is also accepted. It is refreshing to note the remark that the word 'Dravidian' does not represent a distinct race but like the word 'Aryan' is a convenient label to designate those who speak Dravidian languages (p. 10). In the second chapter the contact of Ceylon with India, and the impact of Indian culture are explained.

The succeeding chapter is devoted to the early mediaeval period, from A.D. 362 to 1017, the year of the Cola conquest of Ceylon. During this period there were three political divisions, the northern region with Anurādhapura as capital, the south-eastern region called Ruhuṇa and Malayaraṭa in the centre. Most of the kings of this period belonged to the two clans—the Moriya and Lambakarṇa. The growing interest in Buddhism and the influence of Sanskrit led to much literary activity. The Sinhalese language took its modern form during this period largely influenced by Pali and Sanskrit. In fine arts we find more the influence of South India, especially the Pallava. In 1017 the capital was shifted to Polonnaruva. The Cola ascendancy which continued for a length of time was put an end to by Vijayabāhu I of Malayaraṭa. But it was Parākramabāhu who made extensive conquests and improved the administration in many ways. He was also a patron of Buddhism. After him there was the Kalinga dynasty. But no king of this period seems to have encouraged Sinhalese compositions. The tradition was still in favour of Pali. The next remarkable period in its history was from A.D. 1232 to 1500, the year of the arrival of the Portuguese in Ceylon. In this period the relations of Ceylon with South Indian empires of Pāṇḍya and Vijayanagara are traced. What is important is the establishment of a Tamil kingdom in the north of the Island and the drift of the seat of Sinhalese government to south-east. The book is well illustrated and contains a number of useful maps.

V. R. R.

HOW INDIA IS GOVERNED. By N. S. Pardasani, M.A. (New Book Co. Rs. 3).

In recent years there has been a notable increase in the number of books written on the subject of the Indian Constitution. This has, no doubt, been partly due to the British government's declaration after the last war that it was its intention to lead India up the path of constitutional progress. The rise of Fascism has also produced many attempts to re-evalute constitutions and constitutional methods which have had their repercussions in India. And the Congress demand for a Constituent Assembly has raised constitutional issues which are of vital interest to the whole nation.

These books are a help to the student who would otherwise have to spend valuable time scouring through voluminous reports

and acts of parliament. But it is rarely that they are written in a style which makes them understandable to the ordinary layman. Mr. Pardasani's book is praiseworthy as a comprehensive survey of the Indian constitution and administration in language that is clear and simple.

Before launching on an examination of the existing and projected institutions Mr. Pardasani gives a rather brief outline of the country's constitutional history from the days of Company rule to the resignation of the Congress ministries in November 1939. Then he gives a detailed account of the central legislative and governmental organs both under dyarchy and the proposed All-India Federation in the India Act 1935. Quite naturally much attention is given to the federal scheme and there is a valuable chapter devoted to a critical estimate of its worth. The Provincial constitution is ably surveyed and followed by a useful chapter on the way it worked in practice. The rest of the book is given to an examination of the administration. Such varied topics as federal finance, home government, justice, education, land revenue, police and jails, and even famines are fully discussed.

The title of Mr. Pardasani's book will remind the student of that well-known work by Ramsay Muir "How England is governed." But they are unlike each other in that this is obviously much more of a straight-forward text-book. Mr. Pardasani does not indulge in too much speculation as to what social forces are at work behind the constitution. His aim is to examine and criticize the constitution and this he does efficiently in a running commentary which shows careful judgment and considerable scholarship. It is an extremely valuable handbook for all those who wish to have a real understanding and a true perspective of how the country is governed and can be recommended to student and layman alike.

E. A.

THE HOME LIBRARY CLUB. *Great Men of India*, price Rs. 5-8-0. *Modern Scientific Thought*, price Rs. 4-14-0.

The Home Library Club (*Times of India*, Bombay) is making available to its subscribers an excellent set of volumes both specially contributed and reprinted. We have here one of each class.

The Great Men of India is a series of short but fairly full account of Indians of note, past and present. The book is divided into eight sections—Rulers and Great Leaders (from Chandragupta Maurya down to the present ruler of Bikaner), statesmen and politi-

cians (mostly contemporaries like Malaviyaji, Mahatmaji and Jinnah), reformers and religious teachers (from Gautama Buddha to Vivekananda), authors and poets (from Kalidasa to Tagore), scientists (Bose, Raman, Ray), educationists (Sir Syed Ahmad and Sir Asutosh Mookerjee), judges (Sir Shah Sulaiman) and industrial pioneers (J. N. Tata). The collection is representative. Even a volume of 640 pages cannot but leave out some important names. It is a pity for instance there is no account of Sri Aurobindo, though there is a biography of his influential Chela, Sir Akbar Hydari. There have been South Indian Judges of some eminence, and at least one Judge of marked ability as a Jurist—Sir V. Bhashyam Aiyangar. It is also a pity that the volume or the scheme of classification finds no room for Sir S. Radhakrishnan, the *liaison* officer between East and West. Despite these omissions, perhaps inevitable in any such collection, the accounts are sparklingly clear, vivid and sympathetic. Among the special successes in the volume may be mentioned the notices of Tilak, the three Indian Scientists (all from one pen, that of the present Director of the Tata Institute), Sankaracharya and generally the notices written by the late C. F. Andrews. The profuse illustration of the volume is another feature of great attraction. We trust it will find a place in every library, private or public.

To the second class belongs *Modern Scientific Thought*, containing four books. The first of these is the well-known *Mysterious Universe* of that wizard of astronomical exposition—Sir James Jeans. Though reprinted more than once, the reading public interested in science, but not expert in it, can never have too much of this fascinating account leading up to the concept of "the Great Architect of the Universe.....as a pure Mathematician". The second book on *Animal Biology* is contributed by two distinguished biologists, J. B. S. Haldane and Julian Huxley. "This brief sketch" (about 270 pages, including numerous plates and illustrations, and excluding a very useful glossary) "will perhaps give some idea of the strange series of processes, many of them apparently unconnected, which have yet been necessary for human beings to arise, and for mental activity to become the controlling factor in evolution." The authors never relax their grip on the reader's attention. That popular exponent of Philosophy—Prof. C. E. M. Joad—gives us in some sixty pages a narrative of the *Mind and Its Workings*. Starting with a brief statement of the mind-body problem, the author discusses the views (like behaviourism) which treat mind merely as an aspect of the body, and passes on to the

views which consider mind to be distinct from and independent of body and brain. The mind is not a composite of various faculties, but "an active dynamic synthesising force", an ocean in which waves are distinguishable, but not separable. There is no justification for separating reason from instinct, or emotion from cognition and conation, or the conscious from the unconscious. To disparage the psychology of the unconscious is not, however, to belittle the value of psycho-therapy through analytic methods. Professor H. Levy of London University contributes ten chapters on the *Art of Thinking* in various aspects, e.g. metaphysics (determinism and free-will), art and values, political principles, etc. Prof. Levy is not one of those who believe that the principle of uncertainty has dealt a death-blow to determinism. He holds that the true thinker like the perfect artist and the great man of action would miss no detail but would see them all against the shifting background of history; most of Prof. Levy's readers will subscribe to this position though they may dissent from his own conclusions. This is an altogether stimulating and indispensable volume. There is a very useful index at the end for all four books.

REVISION OF DEMOCRACY by A. Appadorai, M.A., Ph. D., Humphrey Milford, 1940; pp. 74; price 12 annas.

This little booklet comprises two lectures delivered by Mr. Appadorai (of Loyola College, Madras) as extension lectures in the University of Mysore. The titles are the Idea of Democracy and the Institutions of Democracy. Dr. Appadorai is a sympathetic critic with a faith in democracy and a desire to save it. His vision is clear and his outlook sober, such as is worthy of a democrat; for this system of government bases itself on "discussion, gradualness and appeal to reason." While alive to the defects of democracy, he naturally holds that "if, after careful experiment, education fails in its objective, democracy will have to be pronounced a failure; but until then, perhaps it is better to suspend our judgment" (p. 27). The difficulty is to secure the conditions of this "careful experiment." Both politicians and psychologists see in man no longer the reason-dominated animal; at his best as well as at his worst he seems to be at the mercy of instincts and passions which defy the logically formulated programmes of democratic educators. If the recognition of this non-rational nature of man "only makes it more urgent to guide the instinctive disposition of man" (p. 26) we are within measurable distance of Führer-

dom and the negation of democracy. And "if economic tendencies are altered by the very fact that we study them" (p. 71) that would seem an admission of relativity fatal to any absolutism as to fundamentals, even those of democracy. The virtue of democracy is its apotheosis of personality; its vice is the conception of personality in the plural, as finite and as identifiable with you and me. While conserving the merit, we have to eradicate the defect; in the process we may have to make terms even with Communism instead of suggesting that "a true theory of politics depends above all on the rejection of communism" (p. 21). Democracy is not the last word in politics any more than reason is in personality. Dr. Appadorai is young, wise and vigorous; let us hope that he will be one of those to help us to a clearer political vision in the future.

THE NUMBER OF RASAS by Dr. V. Raghavan; Adyar Library, Madras, pp. 192; 1940; price not stated.

Dr. Raghavan is known as a thorough student of Alaṅkāra-śāstra. The present work comprises ten chapters, the central theme being the number of rasas recognised by Bharata, the inclusion or non-inclusion of śānta in these, the distinctive sthāyin of śānta if recognised and so on. The author holds that Bharata himself reckoned only eight rasas. There seems to be little difficulty, however, in justifying the inclusion of śānta-rasa, even if this was later than Bharata's day. As both the author and Mr. Hiriyanna in his foreword point out, the practice of great poets "shows that śānta situations can certainly be delineated in literary works" (p. vii). Perhaps, it is also true, as Mr. Hiriyanna holds, not that śānta rasa appeals to fewer people, but that only the few can capture and cultivate it (p. viii). One wonders, however, if this position marks much advance on the other in saving the right of śānta to recognition; for lack of capacity to capture is not far different from lack of appeal. Perhaps a more satisfactory note is sounded by Abhinavagupta who, unlike other advocates of śānta, held that the ātman itself is the sthāyin of śānta; this ātman "is sthāyin *par excellence*" (p. 86). On such a view, śānta would be not one rasa added to others, but the supreme rasa which is in all others and is yet more than they; it is immanent and yet transcendent; it is parā-pararahasyayogini, for that reason, located by the śākta in the supreme abode, the bindu itself. Śānta therefore appeals to all; but it is not realised by all as the appeal of śānta, being confounded

with one or more of its lower manifestations. An approach on such lines may perhaps render even more valuable Dr. Raghavan's already interesting chapter on rasa-synthesis. Perhaps the almost complete absence of tragedy from the Indian drama may also find some explanation here. As it is, his discussions are able, clear, and sympathetic; and the book will be prized by all readers interested in the philosophy of aesthetic appreciation.

UPPER SCHOOL ALGEBRA: Being an Abridged and Revised Edition of Hall and Knight's Higher Algebra. By L. Crossland, M.A., B.Sc., (Macmillan & Co., Ltd., London) 1940, pp. xv and 292.

The book under review is an offspring of the famous Hall and Knight's *Higher Algebra*. The parent book itself had its birth in 1887 and was largely used for a number of decades by students of Algebra in the Intermediate and B.A. classes in our colleges. It has now been mostly driven out of the field, by recent books with a modern air about them. The treatment of topics such as ratios, commensurables and incommensurables, limiting values, vanishing fraction, convergency and divergency of series, in Hall and Knight's book has the early nineteenth century touch about it. Nevertheless, the book is still valuable on account of its collection of exercises.

L. Crossland has brought out this diminutive edition of Hall and Knight, mainly for the use of nonspecialists offering mathematics as one of a group of three or four subjects for the Higher School Certificate Examinations of various British examining bodies.

The book claims to be an Abridged and Revised edition of the parent volume. It certainly is a considerably abridged edition, containing only 292 pages against the 557 of the original. Many chapters such as those on scales of Notation, Multinomial Theorem, Recurring Series, continued Fractions (Simple, Recurring and General), Indeterminate Equations, Theory of Numbers, Probabilities, and Determinants, have been omitted altogether. On most of the remaining chapters, the axe has been applied to varying extents; the chapters on Convergency and Divergency, Interest and Annuities, Inequalities and Summation of Series have fairly big slices taken off them. The last chapter *viz.*, "Miscellaneous Theorems and Examples" is a piecing together of portions of the last two chapters of the original volume.

While thus the abridgment is quite prominent, the other process, *viz.*, revision, is not in evidence, unless the rearrangement of some of the chapters can be claimed to be revision. In any revision of the parent book, one would expect to find the old-fangled treatment, referred to above, of rates, commensurables and incommensurables, limiting values, and convergency of series replaced completely by a correct and up-to-date presentation; but one is sorely disappointed to find in a book printed in the year of grace 1940, that "an infinite series is said to be convergent when the sum of the first n terms cannot numerically exceed some finite quantity, however great n may be" [§164, p. 138]. The addition of "and if the terms decrease indefinitely" [§167, p. 139] at the end of the proposition: "An infinite series in which the terms are alternately positive and negative is convergent if each term is numerically less than the preceding terms" [Hall and Knight: p. 280 § 280] is revision indeed!

G.A.S.

ODD NUMBERS OR ARITHMETIC REVISED : By Herbert McKay (Cambridge, University Press) 1940 pp. 215.

This is an interesting little book, written in a simple style. Its study will cure the aversion for figures produced in most of us by faulty arithmetic teaching which creates the impression that arithmetic means dull and purposeless manipulation of numbers. This book shows how a study of numbers may be made pleasant and stimulating; it sets out a few of the interesting things "that cry out for arithmetical treatment." It does not employ anything more than the elementary processes of algebra, the definitions only of the trigonometrical ratios and the mere concept of similar figures in geometry.

Chapter I introduces the reader to some large numbers like the measures of astronomical distances and masses, and helps the comprehension of their astounding vastness. In Chapters II and III a simple account of negative and fractional indices is given, leading to the clear understanding of the meaning, construction and use of logarithms. The next three chapters are devoted to the use of proportion in the representation and comparison of large magnitudes. The use and abuse of averages and approximations form the subject matter of chapters VIII and IX. In chapters VII and XII, the author discusses the various systems of units and puts forth a laboured defence of the English system as against the metric system based on the decimal scale which is subjected to a severe

condemnation. There is an interesting chapter relating to the construction and solution of some arithmetical problems. It is a book which every person should read. It is of special appeal to teachers of arithmetic desirous of infusing life into their teaching.

G. A. S.

THE SILAPPADIKARAM, OR 'THE LAY OF THE ANKLET'
By Mr. V. R. Ramachandra Dikshitar, M.A., Lecturer in Indian History and Archaeology, University of Madras, Oxford University Press, 1939; price Rs. 15.

This is a quite delightful almost literal rendering into English of the great ancient Tamil epic, the *Silappadikaram*.

Mr. Dikshitar's service to Tamil this time is unique for *Silappadikaram* occupies a unique place among the ancient Tamil classics now extant. The heroine is a daughter of the Tamil land, and the divineness of feminine fidelity is the prominent theme of the long and majestic poem. More than this, it is the only poem from which we can now have some idea of the old Tamil Dramatic and Musical compositions which are now entirely and perhaps irretrievably lost.

This valuable work, however, had long been a sealed book to almost all English-educated Tamils. Even among the Tamil scholars, there have not been many who could understand the poem as a whole, for its old glossary is too meagre, and its later commentary is not fully available.

Mr. Dikshitar has now given to the English-knowing Tamil world,—nay, to the whole world, the inimitable *Silappadikaram*, by translating it into the world-language.

To translate a long ancient Tamil poem into English is surely no easy work, inasmuch as Tamil greatly delights in ellipses, and great scholars themselves differ in construeing many a passage. So the translation must have cost the author much labour and judgment.

This will ever be a memorable work of Mr. Dikshitar, and will never fail to do honour both to himself and to the Tamils.

And this excellent work may well be commended to the notice of all who are interested in the Tamils and their history and literature.

S. D. Sargunar.
